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LXXV

2025

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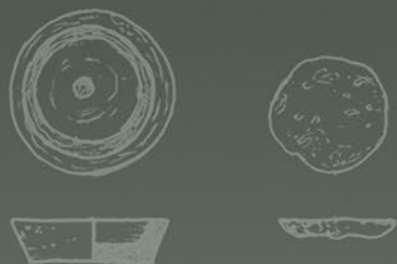


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(фото: Музеј рудничко-таковског краја, Горњи Милановац; цртеж: Драган Ћирковић)

Sur la couverture : Rudnik, pile à godets médiévale

(photo : Musée régional de Rudnik et Takovo, Gornji Milanovac ; (dessin : Dragan Ćirković)



UDK 902/904 (050)

ISSN 0350-0241 (Штампано изд.)

ISSN 2406-0739 (Online)

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STARINAR

Nouvelle série volume LXXV/2025

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САЈНОС доо, Нови Сад

ТИРАЖ

250 примерака

СЕКУНДАРНА ПУБЛИКАЦИЈА

COBISS

Учесталост издавања једна свеска годишње.

STARINAR

Nouvelle série volume LXXV/2025

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250 exemplaires

PUBLICATION SECONDAIRE

COBISS

The Journal is issued once a year.

Часопис је објављен уз финансијску помоћ

Министарства просвете, науке и технолошког развоја Републике Србије

Ce périodique est publié avec le soutien du

Ministère de l'éducation, de la science et du développement technologique de la République Serbie

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THE EARLY BRONZE AGE GRAVE FROM THE SITE OF SVINJARIČKA ČUKA, SOUTH-EASTERN SERBIA

New Data on Burial Customs and Cultural Interactions of the Early Bronze Age in the Central Balkans

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Abstract. – During the excavations of the multi-layered prehistoric site of Svinjarička Čuka in south-eastern Serbia, a single burial was recorded. According to the grave goods, the burial custom, and an absolute date, the burial can be positioned into the second half of the 3rd millennium BC. The remains of the deceased female individual were recorded within a stone cist, accompanied by pieces of gold jewellery and red ochre. Altogether, the burial custom and its architecture are quite uncommon for this region during the Early Bronze Age and, so far, represent a unique find within the South Morava valley and the neighbouring regions. This study provides a detailed interpretation of the grave, along with the anthropological analyses of the deceased and the analyses of the chemical-physical composition of the gold objects.

Keywords. – Early Bronze Age, Central Balkans, burial custom, gold jewellery

According to the chronological system applied in Serbia,¹ the transition from the Eneolithic to the Early Bronze Age in the Central Balkans falls within the second and third quarters of the 3rd millennium BC. Despite intensified research in recent years, this period still holds a great deal of unknowns. Several studies on the subject have been published recently, but they seem to have raised more questions than they have answered.²

This study focuses on a burial discovered at the site of Svinjarička Čuka in the village of Štulac, near Lebane (south-eastern Serbia) (Fig. 9). While this find has provided a glimpse into our understanding of this period, it has also raised numerous questions, particularly regarding the genesis of the population that inhabited the region during the first half of the 3rd millennium BC.

The Site

The site of Svinjarička Čuka is located on a vast, gently sloping terrain, bordered by Svinjarička Creek to the south and Caričin Creek to the east (Fig. 1a). This multi-layered site, which dates from the Early Neolithic to the medieval period, was named after Svinjarička Creek and the term *čuka*, which in Serbian represents a synonym for an elevated position. The site was discovered in 2017 during a survey conducted as part of the *Pusta Reka* project.³ Excavations, led by

¹ Garašanin 1967.

² Булатовић, Станковски 2012; Bulatović *et al.* 2020; Bulatović, Milanović 2020, 167–234; Mladenović, Bulatović 2024; Bulatović, 2025, etc.

³ Horejs *et al.* 2018.

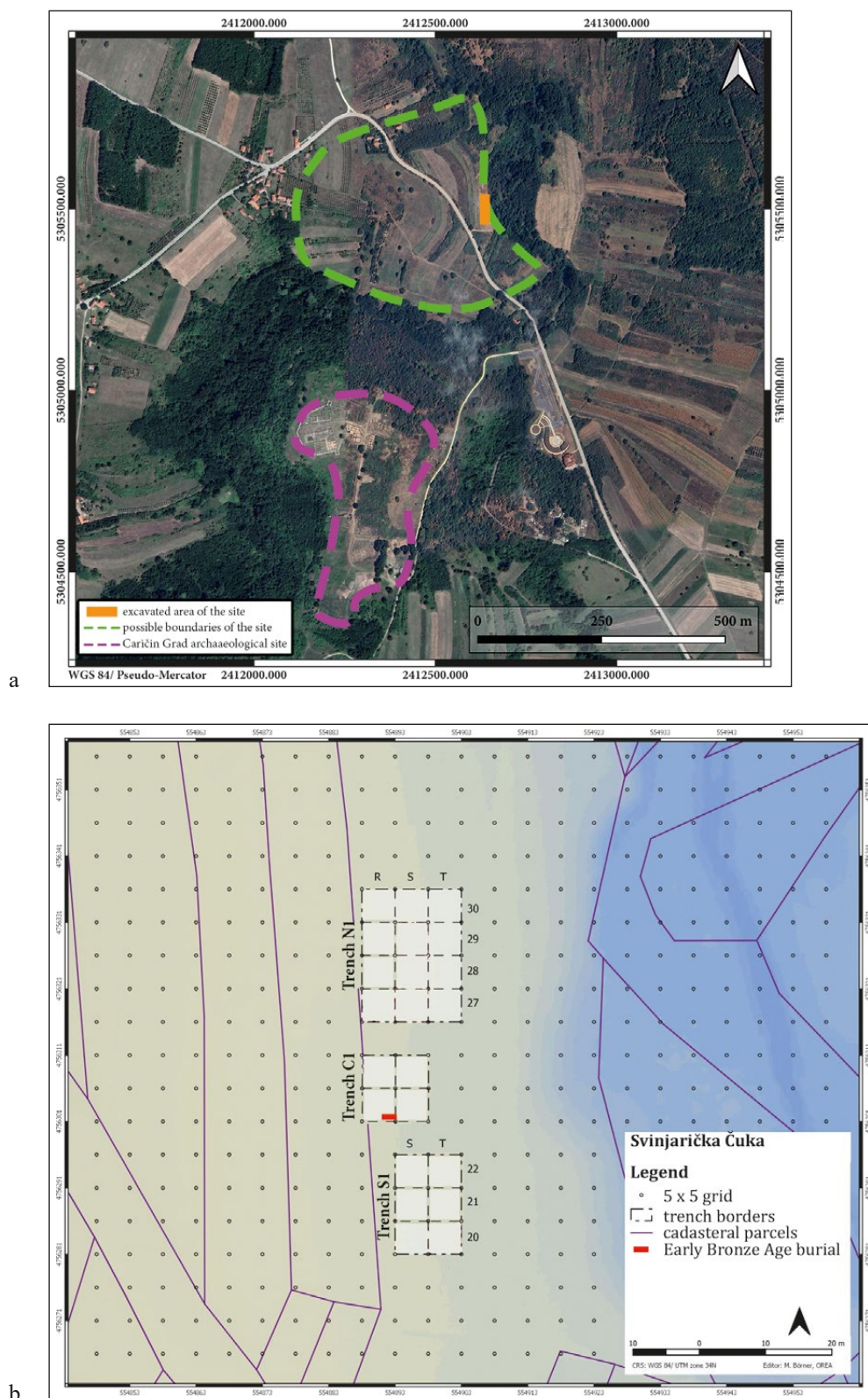


Fig. 1a. Location of the site of Svinjarička Čuka (O. Mladenović)

Fig. 1b. Location of the find of Early Bronze Age burial at the site (A. Bulatović, O. Mladenović)

Сл. 1a. Положај локалитетa Свинјаричка чука (О. Младеновић)

Сл. 1b. Положај проба из ране бронзане доба на локалитету (А. Булатовић, О. Младеновић)

the Austrian Archaeological Institute (formerly OREA), the Institute of Archaeology in Belgrade, and the National Museum in Leskovac, began the following year, in 2018, and are still ongoing.

The archaeological prospection of the site that included the geomagnetic survey and geoarchaeological drilling indicated that the site, which covers an area of several hectares, was settled almost during the entire prehistory. However, excavations have been focused on the gentle eastern slope descending toward Caričin Creek, as this area yielded the most promising results during prospection.⁴

In addition to architectural remains from the Early Neolithic (Starčevo group) and the Late Bronze Age (Brnjica group), as well as cultural layers and features from the Eneolithic, the Iron Age, and the medieval period, an Early Bronze Age burial with an inhumed individual was discovered during the 2023 excavation campaign.

Position and Architecture of the Grave

The grave was discovered within the central trench (C1), located in the central portion of the eastern slope of the site (Fig. 1b). This trench was laid out according to the detection of a large anomaly during the 2017 geomagnetic survey. Initially believed to be the remains of a Late Bronze Age house, excavations instead revealed Neolithic architectural remains at a greater depth.⁵

At the relative depth of around 0.5 m, large stone slabs were recorded, which represented the architectural elements of the stone cist of the grave. Interestingly, no remains of a potential burial pit were recorded, although the surface layer, with a thickness of around 0.3 m, had been heavily disturbed by agricultural activities, which might have prevented the detection of the pit. The remains of the inhumed individual were poorly preserved, with only fragments of long bones, the skull, and the pelvis visible, allowing for only basic analyses. The deceased was laid on large stone slabs in a flexed position on the right flank, oriented east-west, with the head to the west. Based on the number and arrangement of the slabs, they likely formed a rectangular chamber (cist) with a cover. The slabs measured up to 1 m in length, up to 0.6 m in width, and approximately 0.15 m in thickness, though their exact dimensions were difficult to reconstruct due to significant fragmentation. The slabs consisted of mica schist and gneiss. The stone is of local origin and can be found on the northeastern slopes of a near-

by hill, approximately 300 meters southwest of the site.⁶ Reconstructing the original dimensions of the cist is challenging, as all slabs, except for the bottom ones on which the deceased was laid, were found in a displaced position. In their recorded state, the group of slabs measured approximately 3.5 m in length and 0.8–1.5 m in width. However, based on the dimensions of the bottom slabs, it can be estimated that the cist was originally around 1.2–1.3 m long, 0.9–1 m wide, and approximately 0.5–0.6 m high (Fig. 2).

The area north and east of the grave was excavated during that campaign and the following one, but no additional graves were recorded. Trench S1, located several metres south of the grave, also yielded no evidence of burials. The area west of the grave remains outside the excavation zone, leaving its potential undiscovered. Based on the available data, the burial was most likely an isolated grave or part of the periphery of a necropolis extending westward into the unexcavated portion of the site. The configuration of the terrain above the grave was completely flat, and there is no evidence of the potential existence of a mound. However, the possibility of a mound should not be completely discarded, as it could have been deconstructed by communities that settled at the site during later periods. Such a possibility is relatively small, considering the configuration of the terrain and the fact that burials under mounds are not characteristic of this region.

Anthropological analyses of the skeleton

Methods

The state of preservation was evaluated based on the methods of Buikstra & Ubelaker and Brickley & McKinley,⁷ which categorise skeletal completeness as less than 25 %, 25–50 %, 50–75 %, or more than 75 %, as well as surface erosion, which is graded from 0 to 5+. Dentition was evaluated based on the FDI system, following the coding system of Harbeck.⁸ The age at death was estimated using dental abrasion.⁹

⁴ Horejs *et al.* 2019.

⁵ The 2024 excavations determined that the anomaly represents remains of Early Neolithic architecture.

⁶ We would like to thank M. Brandl from the Austrian Archaeological Institute for the information.

⁷ Buikstra, Ubelaker 1994; Brickley, McKinley 2004.

⁸ Harbeck 2014.

⁹ Lovejoy 1985; Miles 1963.



Fig. 2. The Early Bronze Age grave (gold finds marked by blue circle). (A. Bulatović, O. Mladenović)

Сл. 2. Гроб из ране бронзане доба (златни налази обележени џлавим крућом) (А. Булаћовић, О. Младеновић)

Given that the skeleton was poorly preserved, we determined the sex of the individual based on the peptide analysis conducted using the lower left M1 crown. The protein amelogenin, which is associated with the formation of enamel, is linked to the sex chromosomes. The extraction of amelogenin was conducted in accordance with the protocols of Stewart et al. (2017), Rebay-Salisbury et al. (2020), and Rebay-Salisbury et al. (2022).¹⁰ In order to facilitate the subsequent analysis, the tooth surface was abraded with sandpaper and rinsed with hydrogen peroxide and MS-grade water. The cleaned area was then immersed in hydrochloric acid and etched for a period of two minutes, with this process then being repeated. To avoid contamination, only the second etch was used for the peptide analysis. For the cleaning process, C18 ZipTips (87782; Pierce® C18 Tips, Thermo Scientific) were utilized, which

were cleaned three times with acetonitrile and formic acid. The peptides were then bound to the resin, rinsed with formic acid, and eluted into a 0.5-mL Eppendorf microcentrifuge tube using an elution buffer. The samples were dried in a vacuum concentrator and reconstituted in formic acid containing four synthetic standard peptides (AMELY1, AMELY2, AMELY3, AMELX1, AMELX2) for the purpose of internal quality control. The peptide analysis was conducted using an Orbitrap Exploris 480 mass spectrometer in conjunction with an Infinity 1290 liquid chromatography (LC) system. The chromatography was optimised in accordance with the elution times of the peptides (Stewart et al.,

¹⁰ Stewart et al. 2017; Rebay-Salisbury et al. 2020; Rebay-Salisbury et al. 2022.

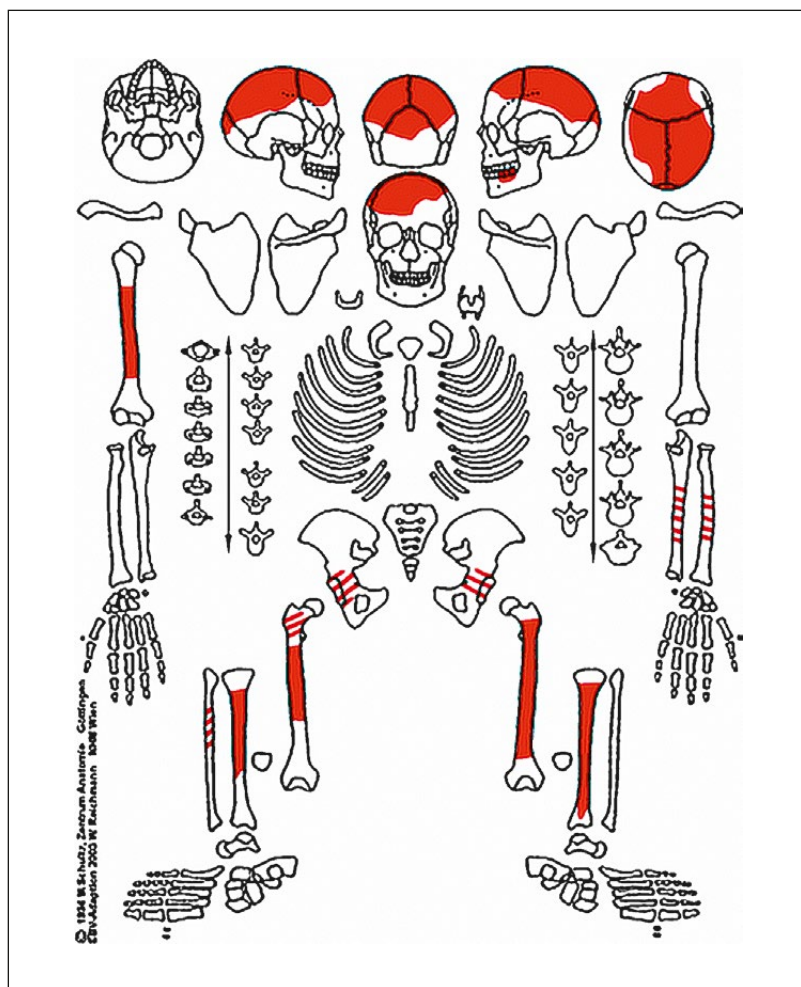


Fig. 3. Preserved bone elements of the deceased (SU 2004). Dashed areas indicate a high degree of fragmentation (L. Waltenberger)

Сл. 3. Очуване кошћи покојнице (СЈ 2004). Испрекидане зоне представљају висок степен фрагментације (Л. Валтенбергер)

2017). The transitions of the peptides were selected for peak integration for each peptide and evaluated with the Skyline software.¹¹ In order to achieve positive protein identification, it was necessary to detect at least one unique peptide. The peptide mass tolerance at the MS1 level was set to 50 ppm for the initial search and 25 ppm for the main search, respectively. A fragment mass tolerance of 20 ppm was established. The isotope distribution proportions were monitored via the Skyline IDOTP score, with an applied cut-off of >0.95 and a mass tolerance of 5 ppm.

Results

The skeletal remains were observed to be poorly preserved, with approximately 25 % of the skeleton present (Fig. 3) and surface erosion graded as stage 5.

All bones exhibited root marks with a netlike appearance, which penetrated the foramina and the medullary cavity of the long bones with extensive post-mortem fracture formation. Recovered fragments in-

clude cranial fragments (frontal bone, both parietal bones, occipital bone, and left mandibular body including M1 to M3 still in the tooth sockets and further non-identified tooth root fragments), long bone fragments of upper and lower limbs (right humerus, left ulna & radius, both femora, tibiae and right fibula) and parts of the pelvic bones around both acetabula. The present bones are in anatomical order. Due to the bad preservation, decomposition in an open or closed space could not be evaluated. Gold ornaments were discovered adjacent to the left side of the cranium, situated at the level of the temporal bone. No morphological features were available for sex estimation. Consequently, sex was determined using amelogenin. In this sample (AnChemID code 24-PEP-0542, ID Peptide code SČ-01), AMELY1, AMELY2, and AMELY3 were not quantified. AMELX1 and AMELX2

¹¹ Schilling *et al.* 2012.



Fig. 4. In situ gold finds
(F. Ostmann)

Сл. 4. Златни налази приликом
откривања (Ф. Осман)

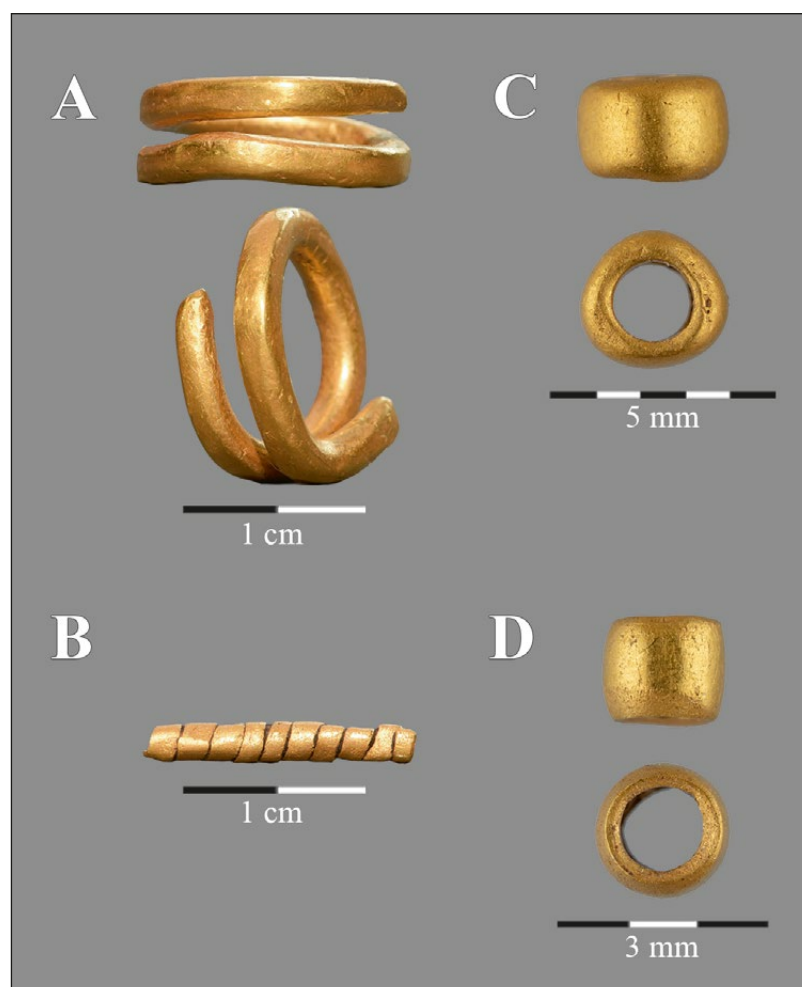


Fig. 5. Gold finds from the grave
(F. Ostmann, A. Bulatović,
O. Mladenović)

Сл. 5. Златни налази из гроба
(Ф. Осман, А. Булатовић,
О. Младеновић)

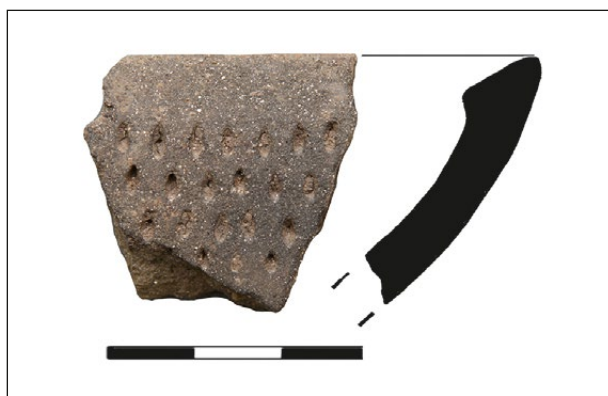


Fig. 6. Potsherd from the grave (A. Bulatović)

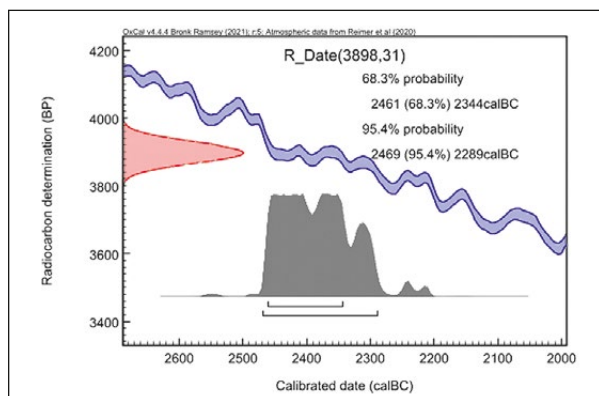


Fig. 7. Absolute date from the teeth of the inhumed individual (A. Bulatović)

Сл. 6. Уломак керамике из гроба (А. Булатовић)

Сл. 7. Ајсолоујни датум добијен из зуба покојнице (А. Булатовић)

were quantified at sufficient concentrations, indicating effective extraction of the peptides from the sample (AMELX1: signal: 50,088,232, threshold: 150,000, AMELX2: signal: 23,693,330, threshold 100,000). The individual was determined as female, based on the analysis of peptides.

Age at death was estimated based on the dentition (development and abrasion). The lower M1 to M3 were all in an occlusal level, indicating that tooth development was complete. This suggests that the individual falls into the age categories early to middle adult (21–35 years). No pathological lesions were observed at the skeletal and dental level.

Grave Goods and chronological determination

Regarding the grave goods, a gold hair-ring (*lock-enring*) and a section of a tube made from a twisted narrow gold band were found near the skull of the deceased (Fig. 4). Scattered throughout the grave were a total of 39 perforated gold beads, which were likely part of a necklace. They were detected in the soil inside the grave, which had been floated completely.

The hair-ring has open ends, a diameter of 15 mm, and is made of 5.1 g of twisted gold wire. The wire is approximately circular in cross-section, though certain segments are rectangular with rounded ends. The dimensions of the cross-section are approximately 2.8 x 2.5 mm, giving the wire a diameter of about 3 mm (Fig. 5a). The ends of the hair-ring are slightly thinned.

The tube weighs 0.5 g and is made of a narrow, twisted gold band, 17 mm long, with a diameter ranging

between 2 and 2.5 mm (Fig. 5b). The width of the band is between 1.5 and 2 mm. A piece, most likely from the same tube, was found among the gold beads during the flotation process. It measures 3.1 mm in length and has a diameter of 2 mm.

The 39 gold beads found within the grave have a circular transverse cross-section, with diameters ranging from 1.5 to 3.5 mm. They also have a rectangular longitudinal cross-section, with lengths between 1.3 and 2.5 mm. All of the beads feature a vertical circular perforation in the centre, with perforation diameters varying between 0.9 and 2.5 mm. The wall thickness ranges from 0.25 to 0.8 mm, depending on the size of the bead (Figs 5c and 5d). The beads are small but precisely crafted, with accurate perforations and bevelled edges. When aligned next to each other, the beads measure a total length of 260 mm.

Besides gold objects, a small potsherd was recorded within the grave. The sherd belongs to a conical bowl with a slightly everted and slanting rim, which is decorated with rows of oblique pricks (Fig. 6).

In addition to the gold beads, the flotation of soil from the grave also yielded two lumps of red ochre.

AMS radiocarbon measurements of a tooth sample yielded a calibrated date between 2469 and 2289 BCE (two sigma range), i.e., between the second quarter of the 25th and the first quarter of the 23rd century BC (Fig. 7).¹²

¹² Horejs *et al.* 2025; Bulatović 2025.

Lab no.	Original ID	Major components [%]			Trace elements [mg/kg]													
		Au	Ag	Cu	Pd	Pt	Mn	Fe	Co	Ni	Zn	As	Cd	Sn	Sb	Te	Pb	Bl
MA-240778	CU23-2004-3-3	89,8	9,8	0,35	<0.1	0,04	2,5	418	0,54	3,8	67,3	0,5	0,13	5,6	4.0	0,36	21,5	5,2
MA-240779	CU23-2004-3-4	90,8	8,9	0,28	0,3	0,07	4,7	453	0,53	4,1	27,8	0,2	0,20	3,1	3,1	0,73	12,7	5,4
MA-240780	CU23-2004-3-5	90,3	9,5	0,18	0,18	<0.02	0,96	109	<0.14	1,28	21,9	0,9	0,16	1,89	1,36	0,17	11,0	12,7
MA-240781	CU23-2004-3-6	91,6	8,3	0,07	0,18	<0.02	1,2	203	<0.14	1,25	14,2	0,0	0,20	0,23	2,43	0,78	9,9	3,5
MA-240782	CU23-2004-3-7	91,0	8,9	0,09	0,17	<0.02	1,9	249	0,30	1,22	19,1	1,4	0,27	1,05	8,2	3,4	24,4	6,3
MA-240783	CU23-2004-3-8	91,3	8,6	0,07	0,22	<0.02	1,7	240	0,21	0,99	18,4	0,2	0,42	0,42	3,1	1,48	10,9	4,0
MA-240784	CU23-2004-3-12	89,7	10,0	0,23	0,24	0,14	1,3	345	0,40	3,0	24,2	0,5	0,11	1,75	2,39	0,90	7,8	3,3
MA-240785	CU23-2004-3-20	88,7	10,9	0,30	0,17	<0.02	16,5	742	0,94	4,6	24,6	0,9	LoD	0,60	0,86	0,14	7,6	1,68
MA-240786	CU23-2004-3-21	90,7	9,2	0,07	<0.1	<0.02	<0.5	55,7	<0.14	<0.6	4,7	LoD	0,50	<0.2	2,36	1,19	5,0	2,96
MA-240787	CU23-2004-3-22	87,8	12,0	0,27	<0.1	<0.02	2,68	112	<0.14	1,9	15,8	0,87	LoD	<0.2	0,56	0,15	6,3	1,60

Fig. 8. Major and trace element concentrations of the gold objects from Svinjarička Čuka. “<” denotes a detection limit, i.e., the true value is lower than the one given in the table. Major elements in mass %. Ru, Rh, Ir, and Se were below detection limits of 0.1, 0.1, 0.01, and 80 mg/kg in all samples (E. Pernicka)

Сл. 8. Концентрације главних елемената и елемената у траговима у златним предметима са локалитета Свинјаричка чука. Знак „<” означава границу детекције, тј. стварна вредност је нижа од оне наведене у табели. Главни елементи су приказани у масеним проценима. Ru, Rh, Ir и Se и у свим узорцима били су испод граница детекције од 0,1, 0,1, 0,01 и 80 мг/кг (Е. Перница)

Chemical-physical composition of gold objects

Methods

The samples were examined at CEZA by a minimally invasive technique using laser ablation coupled with mass spectrometry. The analysis was performed with a mass spectrometer from Thermo Scientific (ICAPQ) in combination with a Resonetics laser ablation system (ArF, 193 nm). The parameters of the ICP-MS were optimized to ensure a stable signal with maximum intensity over the entire mass range of the elements and to minimize the formation of oxides and double ionized ions. The ablation was performed for two minutes with a spot size of 44 µm at 10 Hz and an energy of 5mJ. Before the ablation, 35 seconds of gas blank were recorded. Helium was used as the carrier gas (600 mL/min). The plasma power was set to 1400 W. The cooling, auxiliary and argon gas flow were set to 13.0, 0.7 L/min and 0.9 L/min, respectively. Quantification was performed using ablation yield correction factors with normalization of Au, Ag and Cu to 100 %. Two different external standards (NA1 and NA2) were used for quantification of major, minor and trace elements.¹³ Several standards and reference samples were analysed to verify the reproducibility and accuracy of the results. The results are given in Fig. 8.

Results

The chemical compositions of all objects are rather similar, not only concerning the major components but also the trace elements, suggesting that the gold derives from the same source. Actually, they could all have been made from the same gold charge, e.g., from an ingot. The trace element pattern is somewhat unusual for Early Bronze Age gold, which is generally identified as alluvial gold,¹⁴ characterized especially by the presence of tin and platinum group elements (PGE) in the gold.

Primary gold is not known to be associated with these elements. While the co-occurrence of gold and the most common tin mineral cassiterite (SnO₂) is not uncommon in placer deposits, it is extremely rare in primary deposits.¹⁵ Similarly, other than gold, platinum-group elements (PGE) are usually associated with mafic/ultramafic host rocks. Therefore, PGEs are usually not found in primary gold. Since these elements are among the least abundant in the Earth's crust, they are not often reported in geochemical analyses of gold ores. However, especially palladium and platinum have frequently been found in prehistoric

¹³ Kovacs *et al.* 2009.

¹⁴ e.g. Hartmann 1970; Hartmann 1982; Numrich *et al.* 2023.

¹⁵ Velazques 2014; Cf. Schmiderer *et al.* 2007.

gold objects and explained by the melting of alluvial gold containing platinum-group minerals (PGM) as a very minor accessory component.¹⁶ These minerals are very resistant to weathering and are characterized by a high specific gravity, like gold. They can, thus, be enriched together with gold in placers.¹⁷ While platinum and palladium are soluble in gold and can, thus, be incorporated in melting alluvial gold, the remaining four platinum-group elements Rhodium (Rh), Ruthenium (Ru), Osmium (Os), and Iridium (Ir) are not and are, therefore, even less often reported in gold than platinum and palladium.

The virtual absence of tin, palladium and platinum in the objects from Svinjarička Čuka could be interpreted as an indication of primary gold. However, as yet, there is no indication of primary gold mining in the Early Bronze Age of Europe and not even indirect evidence that primary gold was produced. The only proven prehistoric gold mines are in Georgia (Sakdrisi)¹⁸ and Armenia (Sotk)¹⁹ in the southern Caucasus and in the Rhodope mountains in Bulgaria (Ada Tepe).²⁰ However, practically all gold objects from these regions have been identified as consisting of alluvial gold and cannot be related with primary gold mining.²¹ It would be highly interesting to analyse samples of primary gold from the nearby Lece gold mine to see if their trace element patterns match that of the gold objects from Svinjarička Čuka.

Discussion

The grave at the site of Svinjarička Čuka is the only Early Bronze Age inhumation burial recorded in south-eastern Serbia. A slightly younger necropolis (22nd–19th century BC) is known from the site of Meanište in Ranutovac, located in the South Morava valley, approximately 50 km southeast of Svinjarička Čuka. However, this necropolis contains remains of cremated deceased and is associated with the bearers of the Armenochori group, who settled the South Morava basin south of the Grdelica gorge.²²

Regarding the stone cist, this type of burial is uncommon in most of the Central Balkans but is a common feature of Early Bronze Age burials in western Serbia, where such constructions are typically found within mounds. At the site of Ruja in Dučalović, a grave of an inhumed individual in a flexed position, dated to the 25th/24th century BC, was discovered within a cist made of stone slabs, beneath a mound.²³ A comparable burial was uncovered in the same region, at the site of Rajića Brdo in Guča, where a simi-

lar stone cist with a body in a flexed position was found.²⁴ Additional examples of such burials were also recorded under a mound at Rogojevac in Central Serbia.²⁵ Although the grave has not been precisely dated, the stylistic and typological characteristics of the pottery and lumps of ochre suggest it dates to the first half of the 3rd millennium BC.²⁶ Stone chests or cists are characteristic of the Early Bronze Age in the Adriatic region,²⁷ and such constructions are also known from present-day Albania, both under mounds and within flat necropolises. These cists are typically associated with the Cetina group.²⁸ Since this burial custom has been recorded among different groups and periods, typically in regions where stone is abundant, particularly in karst landscapes, it is generally considered a result of the natural environment rather than a specific ideology or ritual. On the other hand, the idea of “enclosing” the deceased appears to be more significant, given that in the preceding Eneolithic period, the deceased were simply placed in pits or directly on the ground.²⁹

During the Bronze Age in the Danube region, within mounds dating to the late 4th and early 3rd millennium BC, associated with the Yamnaya group, such as those in Vojvodina region, the deceased were enclosed for the first time, using wooden chambers, rectangular burial pits, or various stone structures.³⁰ It seems that the custom of “enclosing” the deceased gradually spread southward into the Central Balkans. This spatial and cultural transmission may have resulted from contacts between the native populations of the Central Balkans and the Yamnaya communities in the

¹⁶ Hartmann 1970; Hartmann 1982.

¹⁷ Cabri *et al.* 2022.

¹⁸ Sakdrisi, Stöllner 2014.

¹⁹ Wolf *et al.* 2013.

²⁰ Popov, Jockenhövel 2017; Alexandrov *et al.* 2018; Jung, Popov 2024.

²¹ Jansen 2019, Kunze *et al.* 2023, Mehofer *et al.* 2024.

²² Bulatović 2020, 81–83.

²³ Dimitrović 2015, 51–58; Bulatović *et al.* 2020, Tab. 1.

²⁴ Dimitrović 2015, 40–41.

²⁵ Srejšović 1976, 117–130.

²⁶ Bulatović 2025.

²⁷ Govedarica 2021, 7–34.

²⁸ Prendi, Bunguri 2010, 212.

²⁹ Letica 1972; Tasić 1995, 53, 62–63, 78; Vojvodić 2000; Borić 2015, 221–227, fig. 35, etc.

³⁰ Włodarczak 2021; Topal, Palalidis 2024, Figs. II.5, II.6.

Danube region, who buried their deceased in chambers beneath mounds. This is further supported by the fact that these communities were highly mobile, or even intrusive.³¹ Regarding chronology, and considering that the mounds in the Vojvodina region predate those in western Serbia, the stone cist in the Central Balkans, particularly in western Serbia, could represent a symbiosis of two groups. Hence, stone cists may reflect an adaptation of Yamnaya burial chambers to the natural environment, local traditions and customs. Although all the burial features from Svinjarička Čuka, such as the flexed position of the deceased (though on the side rather than on the back), the gold hair-ring, the burial chamber, and the use of ochre, suggest a Yamnaya grave, it lacks the primary cultural marker – a mound!

Aside from the stone cists, mound burials in western Serbia, dated to the second and third quarters of the 3rd millennium BC, also contained ochre (Jančići, Dubac, and Veliko Polje; Dučalovići, Ruja; Donja Kravarica; Tolisavac and Banjevcí).³² Ochre has also been recorded within a mound burial in Rogojevac in the Šumadija region.³³ Traces of ochre within graves have also been recorded further to the south, in southern Albania, in the central grave of the mound in Piskova, where a deceased individual in a flexed position on their back was placed without a stone cist.³⁴ This grave has not been dated, yet according to the ceramic inventory it can be attributed to the Maliq IIIa group, meaning the Early Bronze Age.

Regarding the grave goods, it is important to note that the grave from Svinjarička Čuka should be considered one of the “richest” graves in the Central Balkans, alongside burials from Bare and Surčin.³⁵ It contained gold jewellery, including a hair-ring, a necklace made of small beads, and a tube made of a twisted narrow band. This type of hair-ring (Type IA according to S. Alexandrov),³⁶ made of gold or silver, is characteristic of graves from the Yamnaya group in the Danube region during the late 4th and the first half of the 3rd millennium BC.³⁷ Such hair-rings appear during the end of the 4th millennium BC within the Maykop group in the area between the Black Sea and Caspian Sea,³⁸ and further to the north, in the territory of the late Usatovo group.³⁹ During the Early Bronze Age I, the distribution of such hair-rings progressively expanded towards the west and the south, and decreased during the Early Bronze Age II and III.⁴⁰ Interestingly, in the Lower Danube region, such hair-rings have been recorded exclusively within mounds, and their distribution is generally connected with a

vast territory spanning from Chechnya and Dagestan, across Mesopotamia, to Asia Minor and Greece.⁴¹ During the second half of the 3rd millennium BC and the beginning of the 2nd millennium BC, such hair-rings appear in Central Europe (Fig. 9).⁴²

The closest analogy for the necklace made of gold beads and tubes can be traced to Mound I in Bare, in the Šumadija region, where a similar necklace made of gold beads and tubes has been recorded.⁴³ Similar necklaces can be traced from the South Caucasus in the east,⁴⁴ the north-western coast of the Black Sea in the west,⁴⁵ and the coast of Asia Minor in the south, where analogous necklaces made of gold tubes and beads were recorded in the Early Bronze Age layer at Troy.⁴⁶ Necklaces with gold beads, although discoid in shape, have been recorded in Structure 5 at Dabene, dated to the beginning of the third quarter of the 3rd millennium BC.⁴⁷

It has been determined that similar hair-rings discovered in Transylvania (Cacova) were made of alluvial gold,⁴⁸ which may suggest the local origin of finds in other gold-rich regions, including Svinjarička Čuka, with the proximity of the Lece gold mine, which

³¹ Topal, Palalidis 2024, Fig. I.1.

³² Garašanin 1986, 69; Nikitović 1999, 15; Dmitrović 2016, 58–61; Dmitrović, Molloy 2021; Bulatović 2025.

³³ Srejšović 1976, 118–121.

³⁴ Prendi, Bunguri 2010, 205.

³⁵ Srejšović, Jerinić 1963; Srejšović 1976; Vranić 1991.

³⁶ Alexandrov 2009.

³⁷ Alexandrescu 1974, Pls. 8, 10; Đorđević, Đorđević 2016; Alexandrov 2020; Alexandrov 2021; Topal, Palalidis 2024, Fig. II.8; Alexandrov, Włodarczak 2025, Fig. 7.

³⁸ Bronzezeit, Europa Ohne Grenzen 2013, Cat. No. 24.2.4. and 25.5.

³⁹ Alexandrov 2009.

⁴⁰ Alexandrov 2009, 15–16.

⁴¹ Maxwell-Hyslop 1971, Fig. 33; Alexandrov 2009, 15; Stollner 2016; Vasileva 2024, 370; Schwall *et al.* 2024.

⁴² Meller 2019; Kiss 2020, Fig. 3.2.

⁴³ Srejšović 1976, Sl. 2.

⁴⁴ Bronzezeit 2013, Cat. No. 25.7., 117.3.1.

⁴⁵ Topal, Palalidis 2024, Fig. II.9; Alexandrov 2017, Fig. V/1; Vasileva 2024, Figs. 6, 9.

⁴⁶ Blegen *et al.* 1950, Fig. 357; Bronzezeit 2013, Cat. No. 135.1.20; Schwall *et al.* 2024. A similar gold tube was found in an inhumation grave in a stone cist in Movila (Nucet), Dâmbovița County, Romania, which can be connected to the EBA Odaia Turcului group (Zaharia 1987, 33, ref. 2).

⁴⁷ Hristov 2018, Fig. 6; Vasileva 2024, 373.

⁴⁸ Cristea-Stan, Constantinescu 2016.

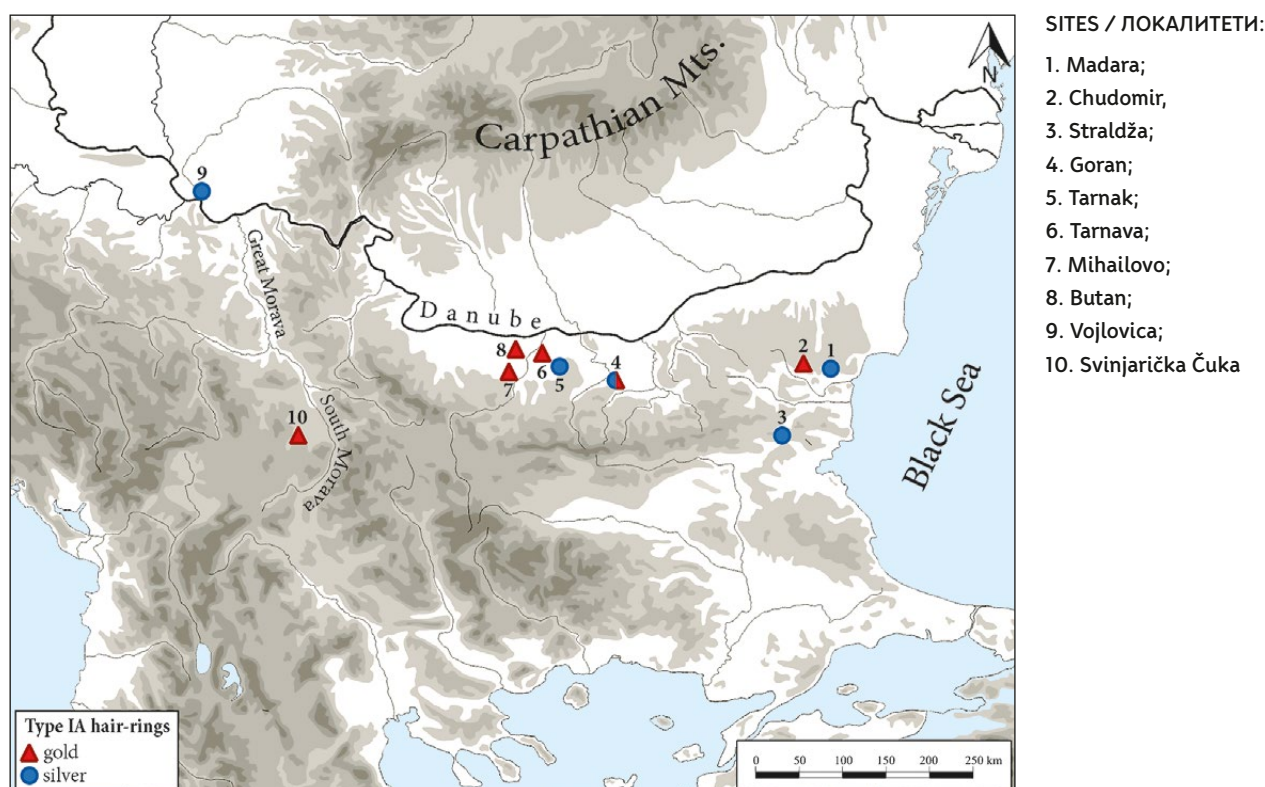


Fig. 9. Distribution of Type IA gold and silver hair-rings in the Danube region during the Early Bronze Age
(A. Bulatović, O. Mladenović)

Сл. 9. Дистрибуција златних и сребрних прстена за косу типa IA у дунавском региону у рано бронзано доба
(А. Булатовић, О. Младеновић)

is located approximately 12 km west of the site by air, especially if one has in mind that the prehistoric communities were aware of the mine.⁴⁹ H. Meller suggests that the gold hair-rings were used for braided hair-styles and represented a symbol of recognition of social elites.⁵⁰

The infill of the grave at the site of Svinjarička Čuka contained a small potsherd that represents a fragment of a shallow semi-globular bowl with a slanted rim with an emphasized inner edge, decorated with parallel rows of oblique pricks (Fig. 6). The form of the bowl and the type of the rim, as well as the technique and motif of ornamentation, resemble the Late Eneolithic pottery of the Central Balkans, particularly bowls of the Coțofeni-Kostolac group that settled in this area until the end of the first quarter of the 3rd millennium BC. This type of bowl, with the same but slightly narrower rim, can be traced to the Bubanj-Hum III group, dating to the final quarter of the 3rd millennium BC, though without ornamentation.⁵¹ Analogies for such bowls can be found in the South

Morava valley, near Leskovac, at the sites of Bobište and Donja Slatina, where similar bowls and ornaments have been recorded, though only as chance finds.⁵² However, the closest analogies originate from the site of Svinjarička Čuka itself, from the cultural layer of the Late Eneolithic, attributed to the Coțofeni-Kostolac group.⁵³ Semi-globular bowls with slanted and everted rims have also been recorded both north and south of the grave, along with pottery decorated with rows of oblique pricks.⁵⁴

⁴⁹ Булатовић, Јовић 2010, 199.

⁵⁰ Meller 2019, 285.

⁵¹ Roman 1976, Pls. 90/1, 91/3, 95/3, 4, 99/5, 6, 9; Kapuran, Bulatović 2012, T. IX/118, T. XI/139; Bulatović, Milanović 2020, Figs. 199/1, 199a/10, 206/7; 206a/10, 218/2, 3, 219/2; Bulatović *et al.* 2020.

⁵² Булатовић, Јовић 2010, T. IX/19, 22, T. XVII/27, T. XIX/41, T. XLV/4, 9.

⁵³ Bulatović *et al.* forthcoming.

⁵⁴ Bulatović *et al.* forthcoming, Pl. 1/7, 9, 10, 18, 21.

The analysis of the stylistic and typological characteristics of the potsherds, along with the stratigraphic examination of analogous examples, suggests that the mentioned potsherd does not originate from the grave but rather from an earlier horizon at the site. This is further supported by the fact that only a portion of the vessel was found in the grave, with no clear connection to the deceased. On the other hand, the central grave at Krstac, at the site of Ivkovo Brdo in western Serbia, contained three similarly decorated small potsherds,⁵⁵ and similarly decorated potsherds have also been recorded within Mound I at Bare.⁵⁶ Hence, the question of the origin of the potsherd from the grave at Svinjarička Čuka remains open.

Conclusion

According to the currently available data, a female individual aged between 21 and 35 years was buried within a stone cist at the site of Svinjarička Čuka in south-eastern Serbia between 2469 and 2289 BC. The individual was placed on her right flank in a flexed position, and accompanied by finds made of gold, which included a hair-ring and a necklace made of gold beads and tubes made from a twisted narrow gold band. The infill of the grave contained small lumps of red ochre and a small potsherd of questionable dating. At the moment, this is the only grave recorded at the site, although it could be a part of a necropolis, since the area west of the grave is currently unavailable for archaeological research. The analogies for the gold jewellery, grave architecture, and burial customs point to strong contacts between the local populations and Early Bronze Age populations of western or Central Serbia, where such burial customs were more common during this period. The gold hair-ring and red ochre suggest certain contacts with the population that carried the customs of the Yamnaya culture from south-

ern Pannonia and the Danube region to the Central and southern Balkans during the first half of the 3rd millennium BCE.

The elements of the Yamnaya culture reflected in this burial, although lacking a mound as a major cultural marker, could be explained by the specific position of the site. The site is located within the territory that represents a contact zone between the autochthonous populations of the South Morava valley and populations of western Serbia, which buried their deceased under mounds, often in stone cists with ochre. The mounds of western Serbia cannot be attributed to the Yamnaya culture, as those rather represent the result of intensive contact between autochthonous populations and communities of the southern fringe of the Pannonian Basin.

The grave from Svinjarička Čuka in fact represents an indicator of large-scale cultural changes that occurred within southern Pannonia, and the Central and south-western Balkans during the first half and mid-3rd millennium BCE. Following the stabilization, those changes resulted in the formation of several cultural groups of the Central Balkans, such as the Bubanj-Hum III, Belotić-Bela Crkva, and Novačka Čuprija-Pančevo groups.

The exceptional and uncommon burial at Svinjarička Čuka offers a new glimpse into burial customs and cultural connections between the Central Balkans and the neighbouring regions during the Early Bronze Age. The burial reflects not only a specific burial pattern, comprised of a set of grave goods and particular architecture, but also offers a new insight into the processes that shaped the formation of the Early Bronze Age cultural milieu in the Central Balkans. On the other hand, the analyses of gold finds from the grave have raised new questions regarding the means and locations of gold procurement during this period, a promising topic to explore during future research.

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⁵⁵ Dmitrović 2016, Fig. 70.

⁵⁶ Srejšević, Jerinić 1963; Srejšević 1976, Sl. 3–5.

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ГРОБ ИЗ РАНОГ БРОНЗАНОГ ДОБА СА ЛОКАЛИТЕТА СВИЊАРИЧКА ЧУКА, ЈУГОИСТОЧНА СРБИЈА

Нови подаци о погребним обичајима и културним интеркцијама раног бронзаног доба на централном Балкану

Кључне речи. – рано бронзано доба, централни Балкан, погребни обичаји, златни накит

Приликом археолошких истраживања на вишеслојном пра-историјском локалитету Свињаричка чука откривен је за сада јединствени налаз гроба из раног бронзаног доба у овој регији. Остаци покојнице у згрченом положају положени су унутар каменог сандука, односно цисте, која се састојала из крупних, готово правоугаоних комада локално доступ-ног камена. Уз доста лоше очуване остатке покојнице, ста-рости између 21 и 35 година, откривени су комади златног накита. У питању су један украс за косу и један комад спи-рално увијене златне жице, откривени уз лобању покојнице, као и 39 златних перли доста малих димензија, које су нај-вероватније представљале део ниске будући да су откриве-не у пределу грудног коша. Поред овога, на основу детаљне анализе земље из гроба, уочени су ситни комади црвеног окера. Апсолутни датум добијен из зуба покојнице кали-брисан је у период између средине 25. и првих деценија 23. века п. н. е. Приликом анализа састава златног накита није

се могло установити његово порекло на основу постојеће компаративне базе података. Ово је посебно занимљиво ако се има у виду да се рудник злата Леце налази свега 12 кило-метара ваздушном линијом од локалитета, што отвара пи-тање његове експлоатације током раног бронзаног доба.

На основу свеукупне анализе гробних прилога, његове архитектуре, хронологије и аналогних примерака, гроб са локалитета Свињаричка чука тренутно представља пре из-узетак него правило у погледу погребне праксе на овом простору током раног бронзаног доба. Присуство камене цисте, златних предмета и окера указује на везе са култура-ма које током 3. миленијума п. н. е. са истока допиру најпре до Подунавља и Паноније, а потом и на простор централног Балкана. Сличне сахране прате се у том периоду на простору Војводине, западне и централне Србије, док гроб са локали-тета Свињаричка чука можда представља финалне одјеке продирања нових погребних обичаја на простор Балкана.

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THE PATTERN OF SETTLEMENT OCCUPATION DURING THE BRONZE AGE IN EASTERN SERBIA: A KEY STUDY OF THE BANJSKA STENA AND POPOVICA SITES

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Abstract. – Over the past fifteen years, systematic studies of prehistoric settlements and necropolises in north-eastern Serbia have substantially expanded our understanding of regional occupation during the Bronze Age. Collaborative research with the Austrian Archaeological Institute has yielded a large number of absolute dates, refining the Bronze Age chronology. Provenance analyses of copper from metallurgical sites have further clarified patterns of resource exploitation, while anthropological studies of cremated remains from urn cemeteries provide new insights into the local population.

This paper examines spatial aspects of prehistoric occupation and settlement organization during the 3rd and 2nd millennia BC, focusing on two hillforts: Banjska Stena and Popovica. These sites illustrate different strategies of settlement placement and continuity, shedding light on the broader dynamics of Bronze Age habitation in north-eastern Serbia.

Keywords. – Northeast Serbia, Early and Middle Bronze Age, Settlements, Hillfort, Banjska Stena, Popovica, occupation patterns

The understanding of prehistoric occupation in north-eastern Serbia has significantly evolved since the early 21st century. This progress has resulted from targeted research conducted by Serbian and international experts over the past fifteen years. In addition to new research projects related to the problems of the Pleistocene and Holocene in this area,¹ systematic investigations, including new surveys and excavations, have produced numerous absolute dates for Bronze Age settlements and necropolises,² while slightly fewer dates were obtained for the Copper Age.

Chronological frameworks for the Metal Ages show notable discrepancies between the eastern and southern Balkans and Central Europe, particularly regarding the onset of the Bronze Age. In Serbia, situated between these regions, archaeologists traditionally followed the Central European chronology, placing the beginning of the Bronze Age in the second half of the 3rd millennium BC.³ However, in the archaeology of the eastern and southern Balkans, there is broad

agreement that the beginning of the Bronze Age should be placed during the transition from the 4th to the 3rd millennium BC.⁴ To reconcile these differences, a collaborative study coordinated by A. Bulatović proposed a revised periodization.⁵

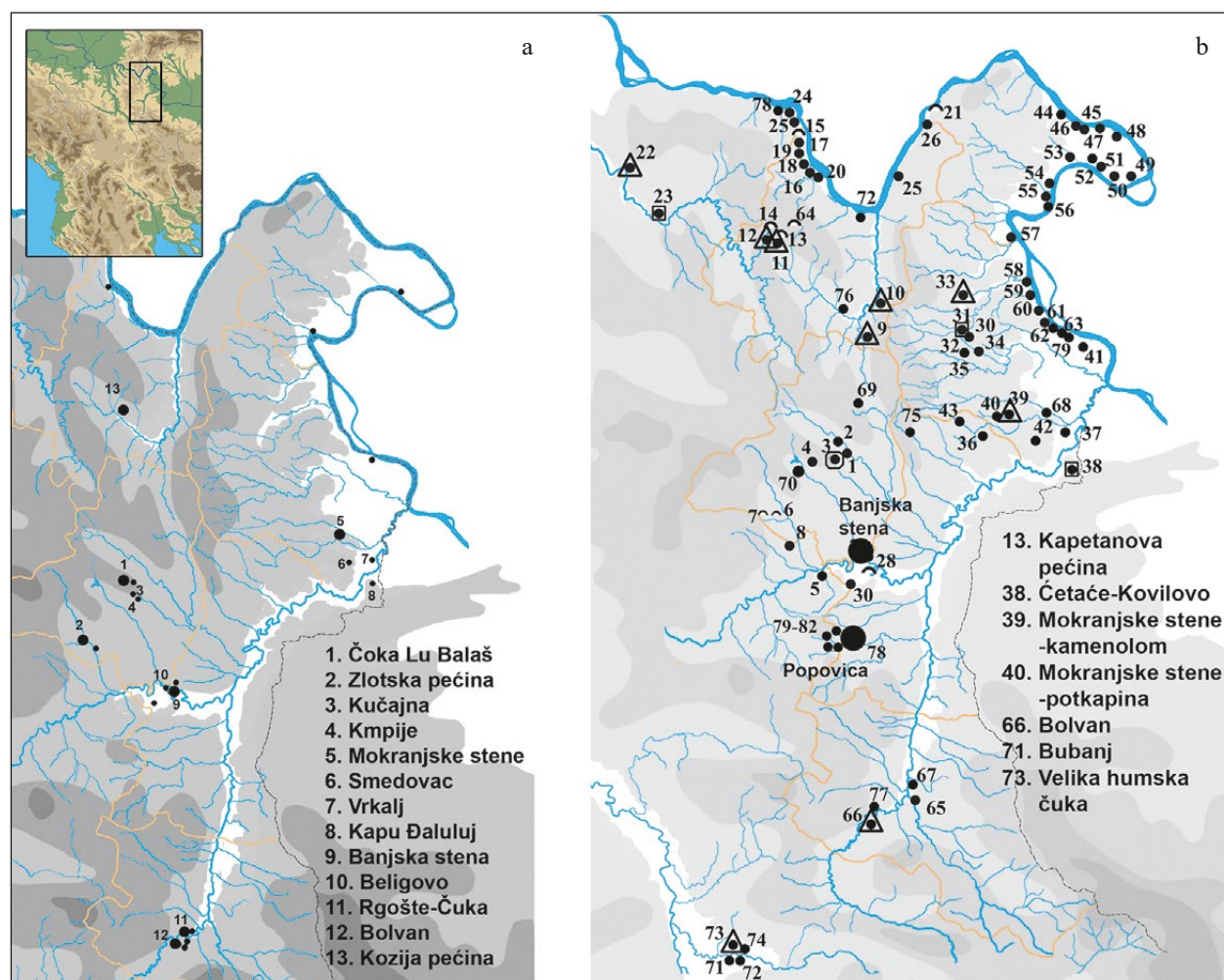
¹ Projects: “Investigation of the Middle and Upper Palaeolithic transition: excavation of Kozija Cave and Mala Cave”, PI: Prof. Dušan Mihailović, Department of Archaeology at the Faculty of Philosophy in Belgrade; “Grandi Scavi: Cacciatori-raccoglitori del tardo Pleistocene e del primo Olocene lungo il corridoio del Danubio nei Balcani”, PI: Dr Dušan Borić, Sapienza, Rom.

² Projects: “Bronze Age in North-eastern Serbia: metallurgy, settlements and necropolises”, PI: Dr Aleksandar Kapuran, Institute of Archaeology Belgrade; “Bronze Age metal producing societies in western and central Balkans”, PI: Dr Mario Gavranović, Austrian Archaeological Institute, Vienna, supported by Austrian Science Fond (FWF), Project number: P32095G.

³ Falkenstein 1998; Tasić 2004; Vasić 2015; Михайлович et al. 2017; Mihailović et al. 2022.

⁴ Tsirtsoni 2016.

⁵ Bulatović et al. 2020.



Map 1: a) Bubanj-Salčuța-Krivodol sites; b) Coțofeni-Kostolac sites

Карта 1: а) Локалитети Бубањ–Салчуца–Криводол културе; б) локалитети Коцофени–Косилоац културе

According to this model, based on radiocarbon dates from indicative contexts and aligned with chronologies in Bulgaria, Greece, and the Adriatic coast, Early Bronze Age 1 (EBA1) in Serbia spans approximately 3347/3097–2878/2739 BC.⁶ This reclassification shifts the Coțofeni-Kostolac culture from the Late Copper Age to the beginning of the Early Bronze Age. Subsequent phases are categorized as EBA2 (Belotić-Bela Crkva, Bubanj-Hum II and Vučedol groups), EBA2–3 (Vinkovci group), and EBA3 (Mokrin group).

Settlement Dynamics in North-eastern Serbia

During prehistory, north-eastern Serbia experienced multiple cycles of settlement and abandonment. These fluctuations may reflect either successive climatic changes or the depletion of essential resources.

In the early Neolithic, parts of the region were occupied by first Starčevo culture farmers,⁷ yet evidence of late Neolithic Vinča communities is limited, with the copper mine at Rudna Glava as a notable exception.⁸ Following the decline of the Vinča culture, the Bubanj-Salčuța-Krivodol complex reoccupied the area (Map 1/a). The prevailing climatic conditions at any given moment likely played a critical role in resettlement and new occupation patterns, as vegetation influences both soil and air temperature, thereby affecting the viability of agriculture and livestock.⁹

⁶ Bulatović et al. 2020, 1173.

⁷ Kapuran et al. 2010.

⁸ Jovanović 1982; Borić 2006; Kapuran et al. 2014.

⁹ Дукић 2006.

Since humans continually strive to adapt to climate change, one strategy has been to migrate, whether seasonally or permanently. Seasonal movements by livestock keepers are evident in their summer migration to cooler, more humid mountainous areas. This defensive or passive response has led to the occupation of neighbouring areas during various cultural shifts and migrations. Unfortunately, paleoclimate studies concerning the Bronze Age in Serbia are lacking; however, we can draw on research conducted in nearby Bulgaria. According to H. Todorova, the demographic hiatus caused by climatic fluctuations in one region often results in population increases in neighbouring regions.¹⁰ She concludes that following the climatic changes and the decline of the Bubanj-Salcuța-Krivodol complex in Thrace and Northwest Bulgaria, depopulation ensued.¹¹ A few centuries later, the Coțofeni-Kostolac cultural complex experienced rapid growth in Eastern Serbia,¹² suggesting that climatic conditions were particularly favourable for pastoral livestock development (Map 1/b).¹³ A similar situation occurred again in Bulgaria during EBA 3 (between 2200 and 2000 BC), marked by a rise in the average temperature, which also led to depopulation in the eastern Balkans.¹⁴

During the EBA, settlements were typically short-lived and located on elevated terraces, reflecting a strategy dependent on mobility and defensive considerations.¹⁵ In contrast, the stable climate of the mid-2nd millennium BC enabled the development of longer-lived Middle Bronze Age (MBA) sites.¹⁶ Tell settlements, such as Feudvar, Židovar, and Gomolava, emerged in the southern Carpathian Basin.¹⁷ In north-east Serbia, there are only three comparable sites with a stratigraphic sequence indicating long-term occupation: Mokranjske Stene-potkapina (Negotin), Banjska Stena (Zaječar), and Popovica (Sokobanja).

During the second half of the 4th millennium, likely as part of migration from the Eurasian steppes,¹⁸ the Coțofeni-Kostolac culture populations began to settle in the region south of the Iron Gate, extending to the territories of the Mlava confluence in the west and through the Kučaj mountains, Bor, Zaječar, and further south toward southern Morava.¹⁹ The Coțofeni culture in Romania is characterized by four main types of settlements: those built on Danube islands, on river terraces, on hard-to-access hilly and mountainous terrain, and in caves.²⁰ In the Serbian Danube basin and its hinterland, documented settlements follow the same pattern, but there are certain contradictions re-

garding the choice of sites, which is somewhat paradoxical and certainly incorporates both environmental and cultural aspects.²¹ Specifically, the EBA1 communities simultaneously occupied the terraces on the left bank of the Danube, the hard-to-access rocky cliffs deep in the gorges of smaller rivers, elevations on the gently sloping terrain of mountain slopes, and also caves. Were these differences in the selection of permanent settlements determined by the complex topography, or were they driven by the desire to assert the dominant presence of their communities in this part of the Iron Gates hinterland, to the extent that they did not want to abandon even those difficult-to-reach locations to anyone else?

Survey data indicates nine settlements located in difficult-to-access positions, typically on slopes of ~45° adjacent to vertical rock faces, often at river gorge entrances or where tributaries join larger rivers.²² Such positions are typically located at the entrances to rocky river gorges and where smaller rivers and streams converge into larger river courses. The cliffs on one side of the settlement are primarily limestone, featuring caves that were likely used for keeping livestock. Kapetanova Pećina near Majdanpek is the only site that has undergone detailed excavation, revealing a cultural layer exceeding two metres associated with EBA1 occupation (Map 1/b).²³ At the sites of Mokranjske Stene-kamenolom, Mokranjske Stene-potkapina, Četeće-Kovilovo, Bolvan, Devojački Kamen and Banjska Stena, we also observe continuity from the Bubanj-Salcuța-Krivodol period (Map 1/b). However, we can clearly see a higher settlement density during the Coțofeni-Kostolac period compared to the previous time (Map 1/b).

¹⁰ Todorova 2007; Božilova, Tonkov 2007.

¹¹ Todorova 2007; Todorova 2007a; Božilova, Tonkov 2007.

¹² Капуран, Булатовић 2012.

¹³ Капуран 2014, 40.

¹⁴ Todorova 2007.

¹⁵ Bailey et al. 2002.

¹⁶ Todorova 2007.

¹⁷ Тасић 1983; Hänsel, Medović 1991.

¹⁸ Bojadžijev 1998; Alexandrov 2011; Włodarczak 2021.

¹⁹ Капуран, Булатовић 2012a.

²⁰ Roman 1976.

²¹ Fletcher 1977.

²² Тасић 2004; Капуран, Булатовић 2012.

Agriculture and Animal husbandry

The soils of eastern Serbia are primarily cambisols (smonica), which are suitable for livestock but less favourable for intensive agriculture. This environmental limitation likely shaped settlement strategies, contributing to a focus on pastoralism and mobility rather than large-scale farming.²⁴ Combined with climatic fluctuations, soil properties and the availability of mineral resources, particularly copper, appear to have influenced settlement dynamics and regional population distribution.

Palaeobotanical analyses from several EBA1 Coţofeni-Kostolac sites in southern and eastern Serbia, including Bujanj and Mokranjske Stene-Potkapi-na, as well as contemporary sites in the southern Carpathian Basin, reveal that early communities primarily cultivated einkorn and emmer wheat (Map 1b).²⁵ Other wheat species and barley were present across the Balkans in varying proportions. At the Gomolava tell, barley and broomcorn millet were stored, suggesting a diversified subsistence strategy.²⁶ During the Middle Bronze Age, at Feudvar tell, 63% of cereal remains consisted of sifted einkorn wheat, while barley accounted for 12%. At the Vatin site in the Serbian Banat, intensive use of einkorn, legumes, and flax has been documented.²⁷ Across the southern Carpathian Basin, settlements show a similar spectrum of cultivated plants, including single- and double-grain wheat (*Triticum monococcum* and *Triticum dicoccum*), soft and hard wheat (*T. aestivum* and *T. durum*), four-row barley (*Hordeum vulgare vulgare*), millet (*Panicum miliaceum*), and spelt (*Triticum spelta*). This data suggests that Bronze Age communities combined cereal cultivation with diverse plant exploitation strategies.

Zooarchaeological evidence indicates a strong predominance of domestic over wild species, with a ratio of approximately 90% to 10%.²⁸ Cattle were more common than sheep, representing 35–39% of domestic species, compared with 26–28% for sheep. A smaller sample from a closed context at the MBA site of Ružana near Bor, however, shows a higher proportion of wild species, such as deer and roe deer, alongside domestic cattle, pigs, sheep, and goats. This data suggests that while pastoralism dominated, hunting remained a complementary subsistence strategy.²⁹

Absolute Dating and Early Bronze Age Chronology

Radiocarbon dates from the Bujanj-Novo Selo site place the beginning of EBA1 (Coţofeni-Kostolac

culture) between 3207 and 3105 BC (68.2% probability) or 3344–3097 BC (95.4% probability). Its end is dated to 2864–2806 BC (68.2% probability) or 2878–2739 BC (95.4% probability), giving a duration of approximately 234–587 years. This data provides a more precise framework for understanding regional settlement dynamics and cultural transitions. At the end of EBA 1, a cultural hiatus occurred in eastern Serbia, as the subsequent absolute dates from settlements and associated cemeteries indicate that human populations began to occupy this area more intensively during the Middle Bronze Age, specifically between the 20th and 18th centuries BC.³⁰ Interestingly, several settlements and isolated graves from the RBD 3 period, such as Kostolac,³¹ Smederevska Palanka,³² Jagodina,³³ Ražanj,³⁴ Niš,³⁵ and Korbovo,³⁶ are located on the borders of eastern Serbia; however, no sites were documented in this specific region south of the Iron Gates. As previously mentioned, and taking into account the depopulation of certain areas in Bulgaria during the transition from the 4th to the 3rd millennium BC, we assume that the hiatus between EBA 2 and EBA 3 in eastern Serbia was likely conditioned by specific climatic fluctuations that undoubtedly influenced settlement dynamics. This remains only a hypothesis, until more analyses are done.

²³ Arheološka istraživanja ovog lokaliteta vodio je Tonko Rajkovača, kustos Muzeja u Boru. A. Kapuran je imao priliku da vidi profil jedne od sonde koja je istražena, sa tragovima više faza naseljavanja, mada su pokretni arheološki nalazi kulturno homogeni i isključivo pripadaju Coţofeni-Kostolac kulturi.

²⁴ Protić et al. 2005.

²⁵ Filipović 2020, 352.

²⁶ Filipović 2020, 352.

²⁷ Filipović, Jovanović 2018.

²⁸ Bankoff, Greenfeild 1984.

²⁹ Kapuran et al. 2016.

³⁰ Gavranović et al. 2025.

³¹ Bualtović et al. 2019.

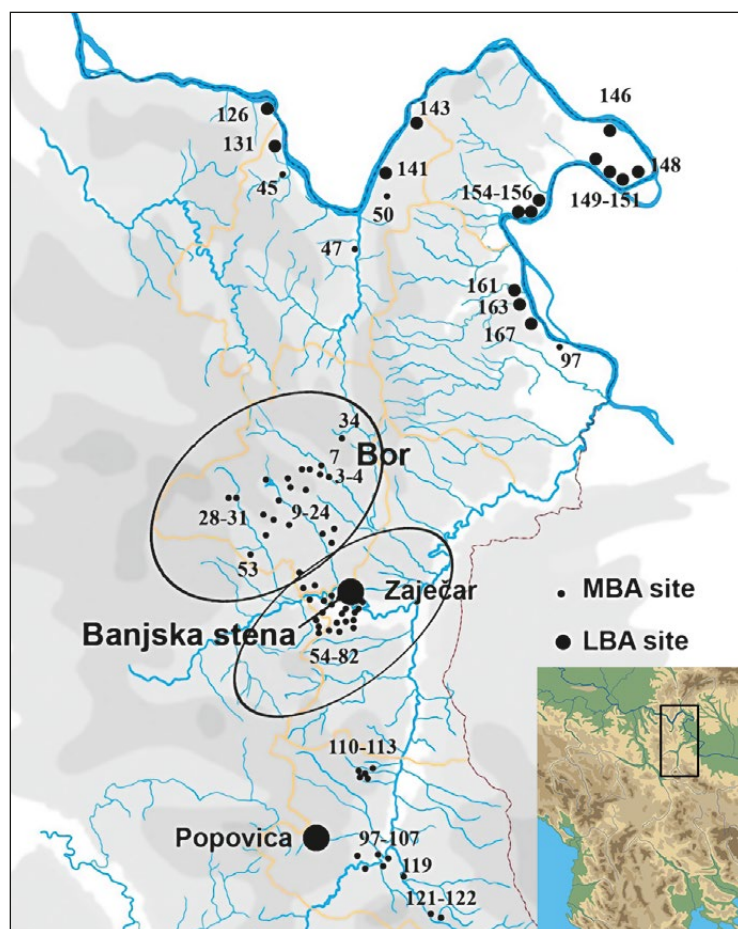
³² Krstić et al. 1986.

³³ Stojić 1986.

³⁴ Tokom 2024. godine na lokalitetu Braljina koji se nalazi kod sela Maćija, otkriveno je naselje iz RBD 3. Istraživanjima su rukovali MA Aleksandar Aleksić iz Zavoda za zaštitu spomenika kulture u Nišu i dr Aleksandar Kapuran. Izveštaj sa istraživanja je u pripremi.

³⁵ Bulatović 2020.

³⁶ Krstić 1986.



Map 2. Distribution and Site Clusters of the Middle and Late Bronze Age in North-eastern Serbia.

Карта 2. Дистрибуција и групе локалитета средње и касне бронзане доба у североисточној Србији

Middle Bronze Age Settlement Patterns

During the MBA, copper exploitation became a significant economic driver, particularly in the ore-rich area around Bor.³⁷ According to the absolute dates, these sites represent the oldest MBA presence in this region, while the group of sites around Banjska Stena near Zaječar and those around Negotin are likely somewhat younger (Map 2). The MBA communities in the vicinity of Bor were primarily engaged in copper ore exploitation and smelting, while the ingots were mainly distributed to neighbouring areas.³⁸ This is indicated not only by various analyses and a number of radiocarbon dates but also by specific parameters of the material culture. Settlement remains are modest: residential structures are poorly preserved, ceramic assemblages are simple, and metal artifacts are scarce. Burial practices, consisting exclusively of cremations with uniform grave architecture, show little differentiation by age or sex.³⁹ In contrast, settlements around Banjska Stena and Gamzigrad, approximately 20 km south of Bor, appear to have relied more heavily on agriculture, as evidence for metallurgical activities is

limited to the Selište and Varzari sites (Map 2).⁴⁰ This suggests a degree of economic specialization within the region, with some communities focusing on metal production and others on farming.

Recent investigations have recorded stratigraphic sequences encompassing EBA1, MBA, and Early Iron Age layers and have provided samples for absolute dating. While the nearby Čoka lu Balaš site may have also featured defensive structures, earlier research lacks precise stratigraphic information.⁴¹ The stratigraphic and chronological data from Banjska Stena and Popovica provides critical insights into regional settlement continuity, defensive strategies, and occupation patterns during the Bronze Age.

³⁷ Kapuran et al. 2022; Gavranović et al. 2025.

³⁸ Gavranović et al. 2020; Mehofer et al. 2021; Mitrović et al. 2024.

³⁹ Kapuran et al. 2022; Gavranović et al. 2025.

⁴⁰ Kapuran 2014.

⁴¹ Tasić 1982, 3; Tasić 1995, 139.

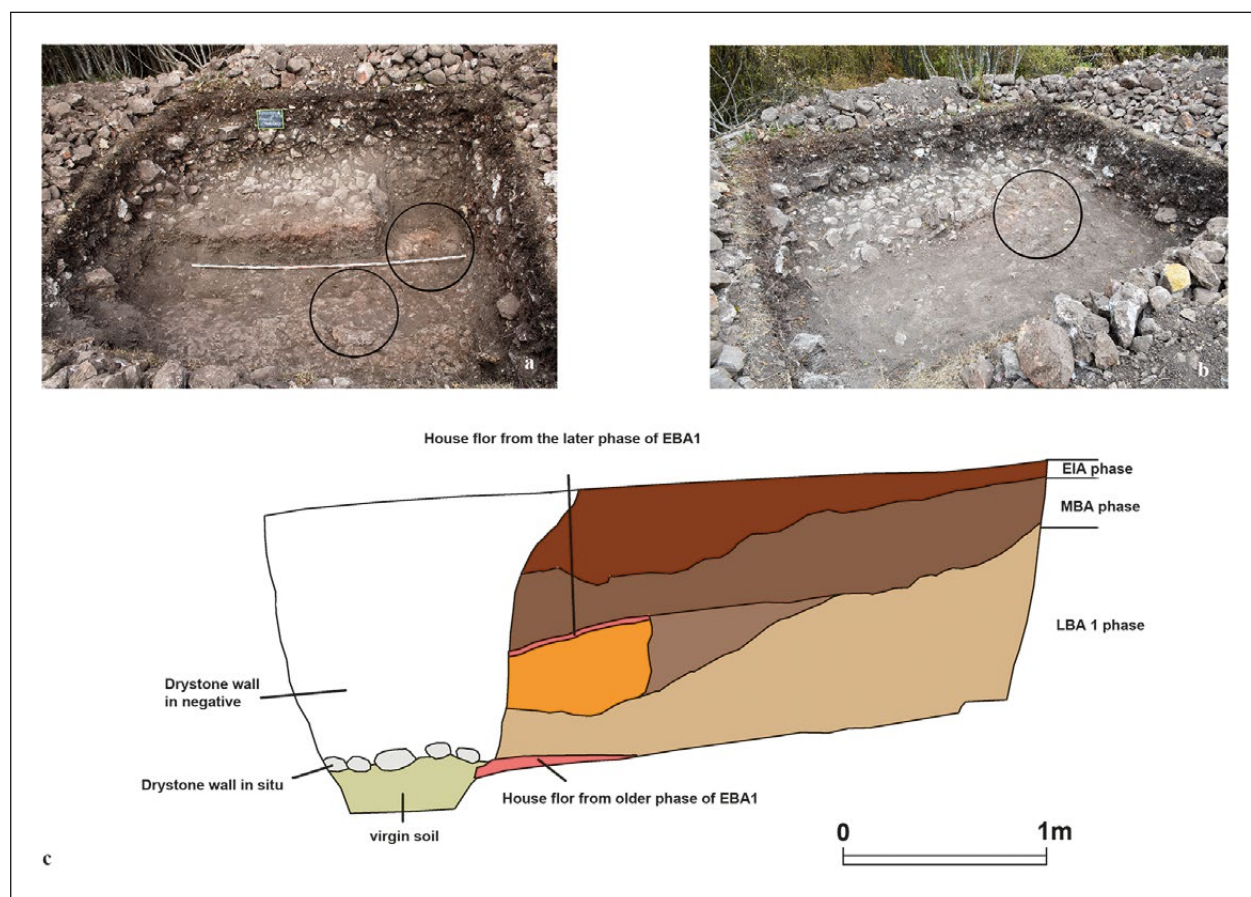


Fig. 1. Popovica Site: a) Tr 5/2023 EBA horizon lower level;
b) Tr 5/2023 EBA horizon upper level; c) Tr 5/2023 eastern profile

Сл. 1. Појовица: а) Сонда 5/2023 хоризонт РБД доњи ниво;
б) Сонда 5/2023 хоризонт РБД горњи ниво; ц) Сонда 5/2023 источни профил

Popovica hillfort

The Popovica hillfort is located 1.5 km east of the centre of Sokobanja (Zaječar County) (Map 2). The site occupies a hill on the northern slope of Mount Devica (1,187 m), overlooking the narrow and deep Morava river gorge to the south. The plateau, at 443 m a.s.l., controls the main route from Sokobanja to Knjaževac and connects the Morava and Timok river valleys (Fig. 10/c). Measuring 55 × 35 m, the plateau lies between two smaller elevations (Fig. 10/a). The site was first documented archaeologically before World War II, with surveys conducted in 1965 and between 2017 and 2019 confirming Popovica as one of the few multi-layered fortified hillforts in eastern Serbia.⁴²

In 2020, a hoard of Patulele-type axes, approximately 200 m from the hillfort, prompted a collaborative project “Archaeological Investigations of Early Iron

Age Sites in Sokobanja Municipality” led by the Institute of Archaeology and the Museum of Knjaževac, in cooperation with the National Library Stevan Sremac.⁴³ Typologically, the axes date to the 3rd millennium BC, suggesting Early Bronze Age activity in the vicinity.⁴⁴

Excavations in 2022–2023 focused on five trenches on the summit and foothills (Fig. 10/b). Two trenches on the higher plateau (Tr/2, 4 × 3 m; Tr/3, 1.5 × 3 m) and one in the foothills (Tr/4, 2 × 2 m) revealed only small cultural deposits. More informative were Tr/1

⁴² Милојевић, Трајковић-Филиповић 2017, 35–36; Mila-nović, Milojević 2019.

⁴³ We would like to thank Dr Miodrag Nikolić, mayor of Soko-banja municipality and Mrs Jelena Stojanović director of the city library for all their support in the realisation of this project.

⁴⁴ Vulpe 1997; Alincăi 2009.

(1.5 × 4 m) and Tr/5 (5 × 5 m) along the northern edge, where detailed stratigraphic sequences were documented. Vegetation and mature oak trees indicated areas of deeper deposits, guiding trench placement.

The stratigraphy (1.8 m thick) records three main occupation phases:

1. Early Bronze Age (Coțofeni-Kostolac culture):

The oldest horizon (~60 cm) contains two distinct occupation phases. The lower layer features compact light-brown sediment rich in pottery, daub, and animal bones. Trench 5 revealed poorly preserved remains of a residential structure, including a 5 cm thick, burned floor adhering to bedrock (Fig. 1/a). The second phase (~30 cm above the first) includes a stone drywall and burnt soil, likely associated with a hearth (Fig. 1/c). Absolute dating of an animal bone (Istoptech Lab, Debrecen, DeA-43027) confirms an age of 4391 ± 24 BP, calibrated to 3100–2910 BC, aligning with EBA1 chronology. This occupation phase is likely connected to the mentioned horde of Patulele-type axes found in the immediate vicinity of the plateau.

2. Middle Bronze Age (Bubanj-Hum IV–Luljaci complex): This horizon is a thin (10–30 cm) dark-brown layer mixed with karstic stones. Pottery finds indicate contemporaneity with the Banjska Stena site. No clear residential structures were observed; however, fragments of pyraunoi suggest heating and cooking activities. The stratigraphy hints at the possible presence of a defensive wall, though destruction limits confirmation.

3. Late Bronze Age and Early Iron Age: Finds from the youngest horizons are less abundant for the Late Bronze Age but more prominent for the Early Iron Age. In the central portion of plateau layers are 20–30 cm thick and sit directly on bedrock. Pottery includes channelled bowls and pots, decorative plastic strips beneath rims, and elaborately decorated goblets with engravings and white inlays. Early Iron Age artifacts are concentrated in disturbed layers in Tr/1 and Tr/5, while better-preserved stratigraphy is found in Tr/2.

EBA1 pottery is typologically consistent with eastern Serbian sites. Common forms include S-shaped, bell-shaped, and elongated-neck pots, as well as semi-globular and biconical bowls (Fig. 2/1–7). Decorations include chessboard-like punctures, oblique impressions, carved triangles, vertical grooves, and “wolf teeth” motifs resembling the

Vučedol style (Fig. 2/1, 22, 27), a series of short oblique impressions (Fig. 2/7, 15), triangles created using carving or imprint techniques (Figs. 2/23, 24, 25), and vertical grooves mostly found on the belly of the bowl or its handles (Figs. 2/12, 20). A smaller number of vessels feature embossed inverted triangles, commonly referred to as “wolf teeth,” representing recurrences of the Vučedol culture (Fig. 2/6, 10, 17, 26).⁴⁵ Semiglobular bowls with a characteristic “T” cross-section are occasionally adorned on the inside of the rim with vertical or oblique incisions or with a ‘furchenstich’ (Fig. 2/14–19).

The ornaments arranged as metopes, or chessboard patterns, are more characteristic of the Kostolac culture, while the incised lines, particularly in the form of nets (Figs. 2/2, 28), show more similarities to the Coțofeni culture, specifically its third phase, as evidenced by sites in southeast Bulgaria (Dubene-Svarovka).⁴⁶ Chessboard decoration is prevalent on pottery from Layer IV (2–3 horizon) at the Bubanj site.⁴⁷ Based on the stratigraphy and chronological sequence of the Bubanj site, all of the aforementioned decorative techniques date to the end of the 4th and the beginning of the 3rd millennium BC.⁴⁸ The decoration featuring embossed triangles exhibits certain similarities with the Vučedol culture; however, based on the dates obtained from the skeletal grave at Glogovac near Bela Palanka, this decorative style also appears in the surrounding area during the 3rd millennium BC.⁴⁹ Notably, one fragment of a neck and belly displays three decoration techniques: stitches, incised hatched triangles, and furchenschicht (Fig. 2/23). It is worth mentioning that in Popovica, unlike many of the EBA1 sites, only one fragment of a bowl decorated with triple vertical appliquéd bands below the rim was found (Fig. 2/29).

An important element is the stone wall found in trenches 1 and 5 on the northern edge of the plateau (Fig. 1/a-b). The stone structure is approximately 1 metre wide and shows signs of more recent damage, as the stone was utilized for quicklime production. For the most part, the wall was constructed from limestone, most likely sourced from the bed of the Moravica

⁴⁵ Милојевић, Капуран 2023; Лазевић, Љуштина 2017, Т. 2/4.

⁴⁶ Bulatović 2020, 215.

⁴⁷ Bulatović 2020, Fig. 204a.

⁴⁸ Bulatović 2020, 216.

⁴⁹ Bulatović et al. 2020, 1171, Fig. 7.

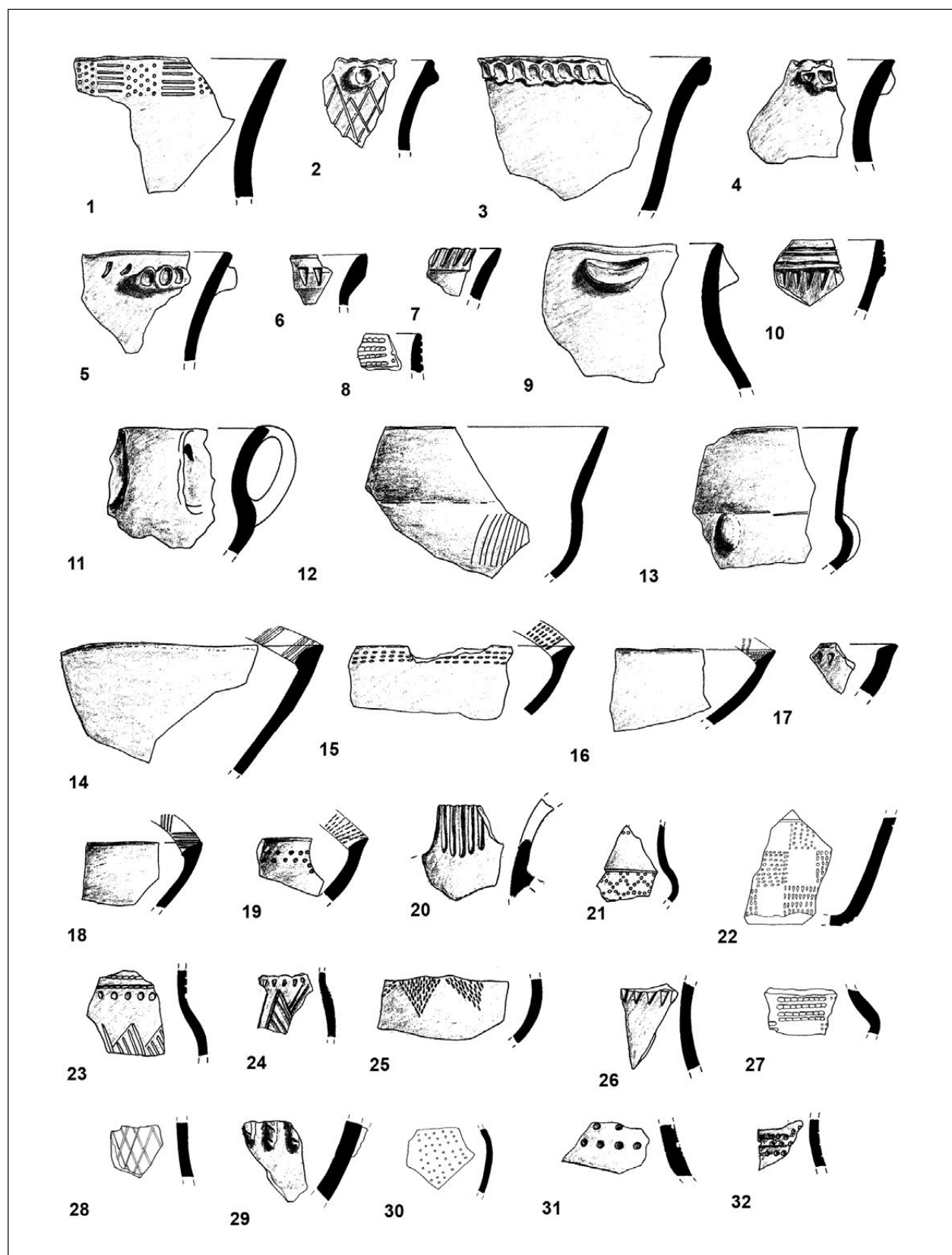


Fig. 2. EBA pottery from the Popovica site

Сл. 2. РБД керамика са Појовице

river at the base of the hill fort. The stones from the river bed are held together by clay mixed with a large amount of sand, which has a distinct yellow colour. We found that only the lower row of stones remained in situ (as this row did not consist of limestone pebbles), while the rest of the wall was dislocated, leaving only negative picture (Fig. 1/c). The wall in its full width is also clearly visible in the east profile of trench 5. The floor and hard, fired soil from the later phase of the cultural layer assigned to Coțofeni-Kostolac were attached to the inner face of the stone wall in the northern part, indicating that the fortification was most likely constructed during the second phase of the EBA1 occupation (Fig. 1/b). This phase also includes a thicker layer of red and dark-red fired earth, which we believe represents a hearth inside the house.

The only analogy for fortification architecture during EBA1 in eastern Serbia is the Čoka lu Balaš site near Krivelj. In this fortified settlement, a stone wall protected access from the eastern side.⁵⁰ Based on the preliminary reports, we still have some uncertainty as to whether this rampart belongs to the Bubanj-Salčuța-Krivodol or the Coțofeni-Kostolac horizon.

The assumption that the oldest horizon on Popovica belongs to EBA1 is supported by an absolute date obtained from an animal bone.⁵¹ The measurement was conducted at the Istoptech Lab in Debrecen with the number DeA-43027. The absolute age of the sample is 4391 ± 24 , with calibrated values ranging from 3100 to 2910 BC, which aligns well with the previously published dates for EBA1 in the central Balkans.⁵² This occupation phase is likely connected to the mentioned horde of Patulele-type axes found in the immediate vicinity of the plateau.

The next cultural horizon represents a relatively thin layer (10–30 cm) of dark-brown sediment mixed with stones of karstic origin. Based on the pottery finds, this horizon belongs to the MBA and is somewhat contemporary with the Banjska Stena site. The later occupation of the Popovica site by Early Iron Age communities led to the partial destruction of the MBA layers. Unfortunately, we did not find any clear traces of MBA features or structures in the investigated area. Several fragments of pyraunoi, which were primarily used for heating and cooking, indicate the presence of a residential structure.⁵³ According to the stratigraphy of the eastern profile, we can infer that during the MBA, a defensive wall may have also existed in the same location. This is difficult to substantiate because the entire dimension of the stone wall

has faced destruction in recent times, but it seems logical to assume that the fortification, or at least parts of it, were preserved even after new communities settled in Popovica centuries later.

Among pottery finds, coarse ware with stone tempering, primarily consisting of larger storage pots, dominates. The rims are adorned either with fingerprints (Fig. 3/10) or with plastic ribbons, which are similarly decorated with fingerprints or various tools (Fig. 3/10, 11). Notable among the diagnostic pottery are cups featuring triangular or trapezoidal extensions (Fig. 3/7, 8), which represent a characteristic and chronologically significant element of pottery identified as Bubanj-Hum IV–Ljuljaci horizon in the Šumadija, Nišava, and Morava basins, as well as in the Bor region of north-eastern Serbia.⁵⁴ A remarkably similar cup was used as a lid for one of the urns (grave 1) at Hajdučka Česma near Bor, with absolute dates indicating the 20th century BC.⁵⁵ The MBA diagnostic pottery also features horizontal and bow-shaped handles (Fig. 3/12, 13), which are found at the Banjska Stena and Magura sites near Zaječar, Velika Humska Čuka near Niš, and Antimovo near Vidin in north-western Bulgaria.⁵⁶ A knee-shaped handle (Fig. 3/9) is also indicative of the MBA period, with strong parallels at the Ljuljaci site near Kragujevac.⁵⁷ A fragmented, sharply biconical belly with a vertically positioned, coiled semi-handle (Fig. 3/17) has analogies among MBA pottery from Banjska Stena. The bowls are predominantly semiglobular (Fig. 3/4–6, 8) or biconical (Fig. 3/1–3). The remaining handles are either knee-shaped (Fig. 3/16), coiled (Fig. 3/17), or horizontally placed and rectangular (Fig. 3/14). The decoration of MBA pottery is notably more modest compared to EBA1, with plastic ribbons and imprints being the most common elements.

Numerous pottery finds from Popovica are identified as fragments of pyraunos-type vessels, which are mobile hearths used for heating indoor spaces or

⁵⁰ Tasić 1982; Тасић 2004.

⁵¹ Autori rada zahvaljuju kolegi A. Bulatoviću na dobijenom datumu.

⁵² Bulatović et al. 2020, 1174–1175.

⁵³ Bulatović, Kapuran 2007; Капуран 2009.

⁵⁴ Булатовић, Станковски 2012, 69–71, 337–349, Т. III/20–21.

⁵⁵ Gavranović et al. 2025.

⁵⁶ Александров, Даскалов 2005.

⁵⁷ Богдановић 1986.

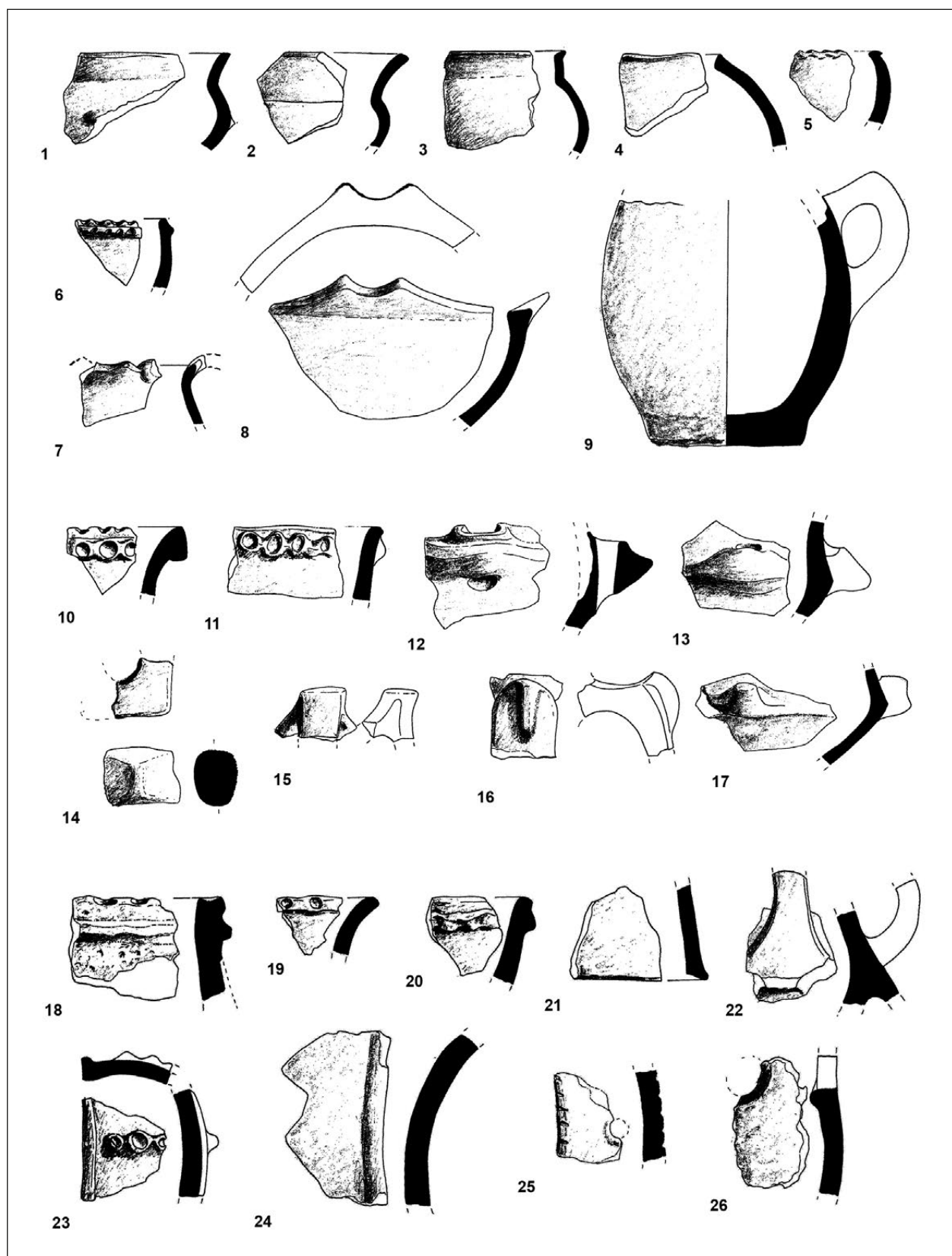


Fig. 3. MBA pottery from the Popovica site

Сл. 3. СБД керамика са Појовице

warming food. This extremely coarse pottery is particularly prevalent in MBA settlements around the city of Bor, and it appears to have been primarily used in residential features constructed from easily flammable organic materials such as wood, reeds, or straw. A pyraunos pot consists of two conical, interconnected pots; the upper part serves as a fire container, while the lower part prevents direct contact with the floor (Fig. 8/1). The decoration technique of pyraunoi from Popovica closely resembles that of the pyraunoi found at sites around Bor, further confirming the presence of MBA occupation at the site. The rims of the upper part (upper vessel) are most common (Fig. 3/18–20), along with openings on the lower part, often featuring circular perforations (Fig. 3/23–26). The most distinctive fragments are the joints of the upper and lower parts (Fig. 3/22).

The youngest phase at Popovica is represented predominantly by Early Iron Age (EIA) finds, which overlay the MBA layers. This horizon is relatively thin (20–30 cm) and sits directly above bedrock in the central plateau area. Due to the overlaying of older layers and the partial destruction of the stone wall, EIA materials are concentrated in disturbed contexts, particularly in Tr/1 and Tr/5, while the stratigraphy in Tr/2 remains better preserved. The pottery types are diverse, including both interior and exterior channelled bowls and pots, as well as pots adorned with decorative plastic strips glued directly under the rim. Early Iron Age goblets are elaborately decorated with engravings and white inlays.⁵⁸

Interpretation of Settlement Continuity and Fortification

The stratigraphic sequence at Popovica demonstrates long-term occupation from the EBA1 through the EIA, with intermittent MBA activity. The EBA1 Coțofeni-Kostolac occupation represents the initial establishment of the hillfort, including residential structures and hearths. Fortification construction suggests an emphasis on defensive strategies, potentially in response to inter-community competition or control over key resources and routes.

MBA occupation is marked by residential activity, the use of pyraunoi, and modest fortification remnants. While direct evidence of assumed architecture is limited due to post-depositional disturbances, the continuity of settlement in a strategically advantageous location indicates that fortification elements may have been reused or adapted by subsequent communities.

The EIA phase exhibits increased material density, including elaborately decorated pottery and more robust domestic features, suggesting a period of intensified occupation. The persistence of the fortified plateau underscores its enduring importance in regional settlement networks, controlling movement along the Sokobanja–Knjaževac corridor and access to the Morava and Timok valleys.

Banjska Stena hill fort

The Banjska Stena hillfort is situated on a rocky cliff overlooking a large meander of the Crni Timok river (Fig. 4/a). Thermal springs in the vicinity, now known as Gamzigradska Spa, likely held significance for prehistoric populations, reflecting a broader trend of EBA1 settlements near thermal water sources, as observed at Popovica.⁵⁹ Strategically, Banjska Stena commands the primary east-west route through north-eastern Serbia.⁶⁰ The site was systematically examined by D. Srežović and his team from 1993 to 1996, marking the last major discovery of his career.⁶¹ This was likely a key reason why the fieldwork remains only partially published.⁶²

Since 2017, intensified research by the Institute of Archaeology in Belgrade and the Austrian Archaeological Institute has expanded understanding of Bronze Age occupation in north-eastern Serbia.⁶³ Research on Bronze Age sites in north-eastern Serbia has significantly intensified since 2017. Geophysical surveys conducted in 2017 revealed numerous anomalies, primarily indicating burned features, filled pits, and zones of intense burning,⁶⁴ providing a foundation for the joint Serbian-Austrian excavation in September 2022. The results of the geophysical survey provided a solid foundation for the revision excavation of the joint Serbian-Austrian team in September 2022. Excavations uncovered cultural layers and artifacts spanning the Early Copper Age, Early and Middle Bronze Ages, Late Iron Age, and Late Antiquity.

⁵⁸ Милојевић et al. 2025, Tab. 23–24.

⁵⁹ Милојевић, Капуран 2023.

⁶⁰ Капуран 2014.

⁶¹ Срејовић, Лазих 1997; Лазих 2010.

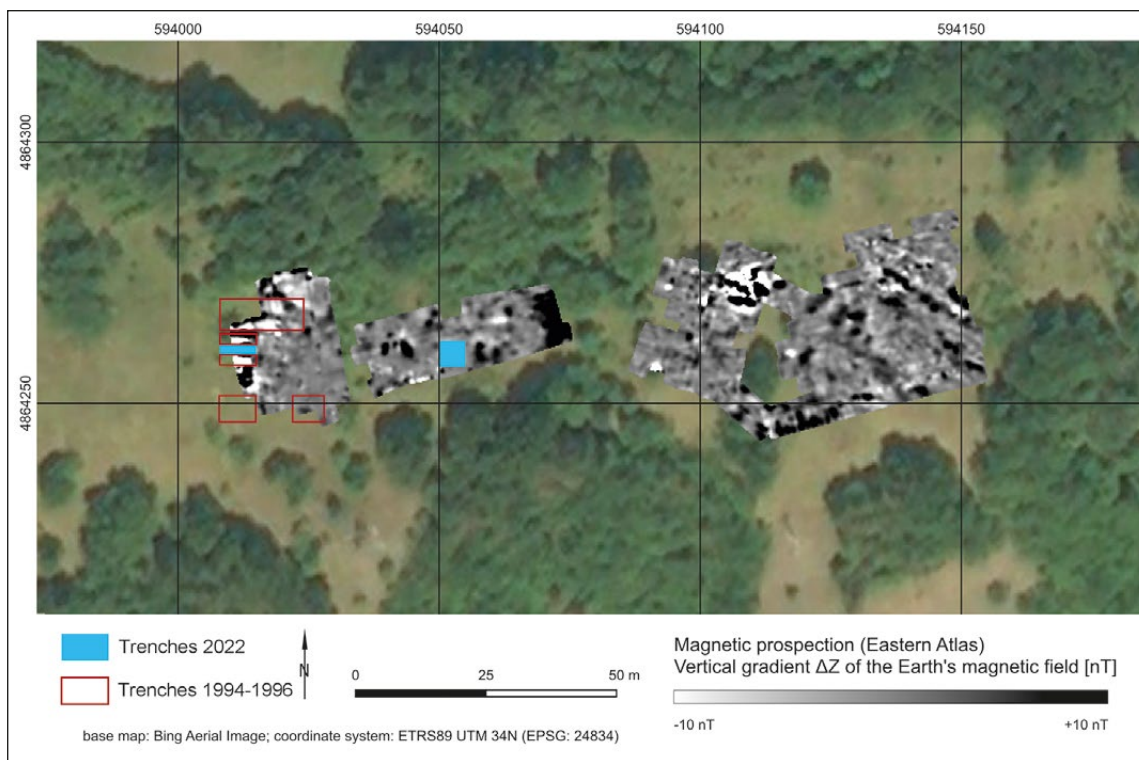
⁶² Срејовић, Лазих 1997; Лазих 2010.

⁶³ See Footnote 2.

⁶⁴ Meyer, Нупиак 2018.



a



b

Fig. 4. Banjska Stena site: a) Picture from the northeast; b) Geomagnetic prospection with distribution of the trenches

Сл. 4. Бањска стена: а) слика са североистока; б) ђеоматнејна ѓросјекија са расѓредом сонѓи

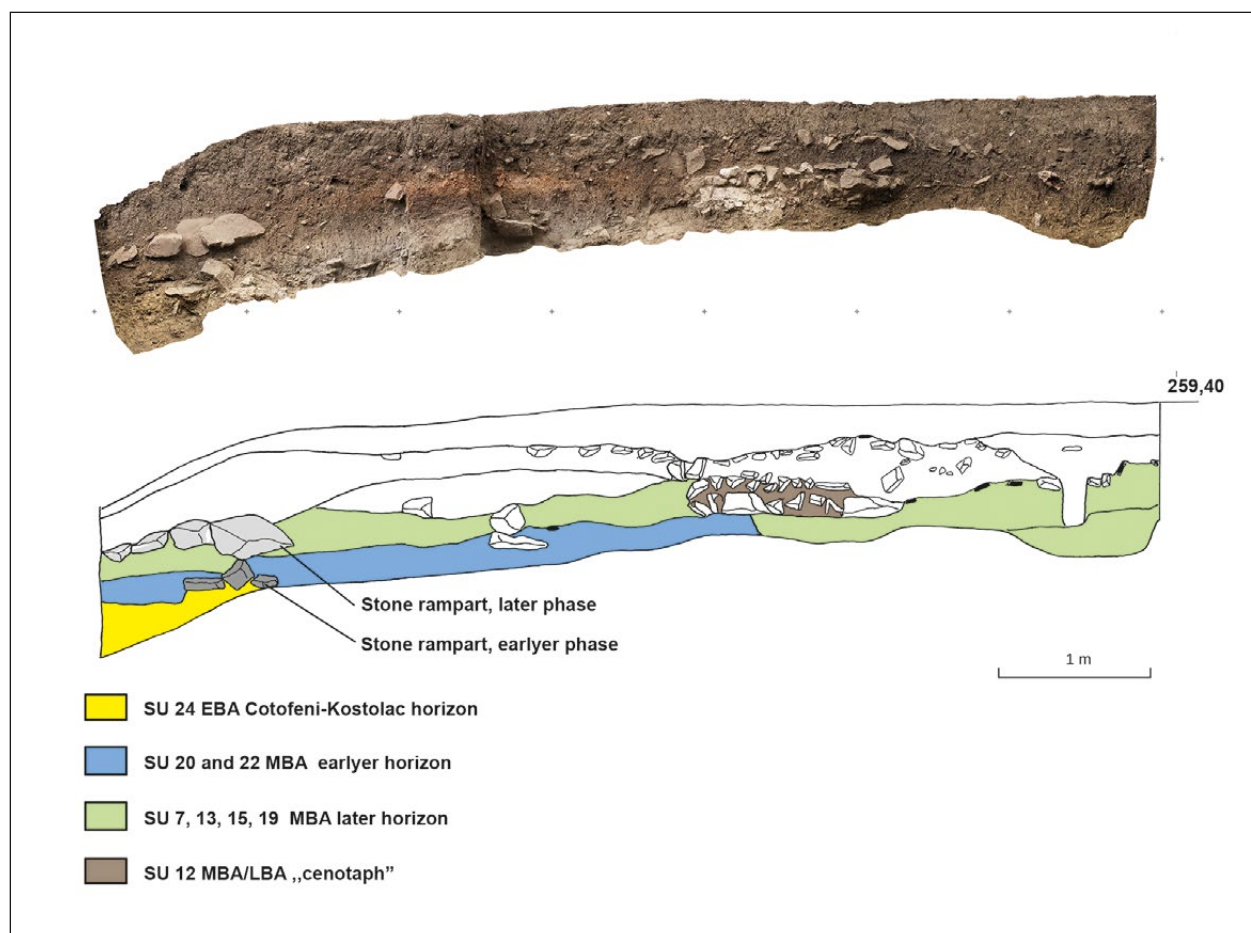


Fig. 5. Banjska Stena site: a) Image of the northern profile of the trench 1/2022

Сл. 5. Бањска стена: а) Изглед северног профила у сонди 1/2022

Early Bronze Age (EBA1) Occupation

The earliest occupation at Banjska Stena likely occurred during the second half of the 5th millennium BC, associated with the Bubanj-Salcuța-Krivodol complex, but evidence is limited to surface and secondary-context pottery, suggesting brief and temporary use. Nearby Beligovo, however, indicates the presence of larger Early Copper Age settlements in the region.⁶⁵

The first in situ cultural horizon (SU24) consists of yellowish silt soil and is attributed to the Coțofeni-Kostolac phase of EBA1 (Fig. 5). Pottery closely resembles materials from Mokranjske Stene near Negotin,⁶⁶ showing a prevalence of Coțofeni traits over Kostolac features, including inverted bell-shaped pots (Fig. 6/3–5), globular bowls (Fig. 6/1–2), and onion-shaped cups with extended handles (Fig. 6/16). The decoration includes incised lines (Fig. 6/ 6,10),

plastic ribbon strips (Fig. 5/ 5, 7–8, 11), pointed stabs (Fig. 6/ 1,7–9, 14), *falschschnur* (Fig. 6/ 12), *furchenschnitt* (Fig. 6/ 13), comma-shaped imprints (Fig. 6/ 4,15), and appliques. Other shapes from this phase consist of cups with cylindrical necks and short bellies (Fig. 6/16), pots with vertical (Fig. 6/10) or conical necks (Fig. 6/ 5–6, 11), and larger storage vessels.

An absolute date from an animal bone (VERA-8028) places this horizon at 4354 ± 38 BP, calibrated to 3035–2895 BC (86.5%), consistent with dates from Popovica (4391 ± 24 , 3100–2910 BC) and previously published absolute dates from Mokranjske Stene.⁶⁷

⁶⁵ Николић, Ђуричић 1997.

⁶⁶ Булатовић 2015.

⁶⁷ Bulatović et al. 2020.

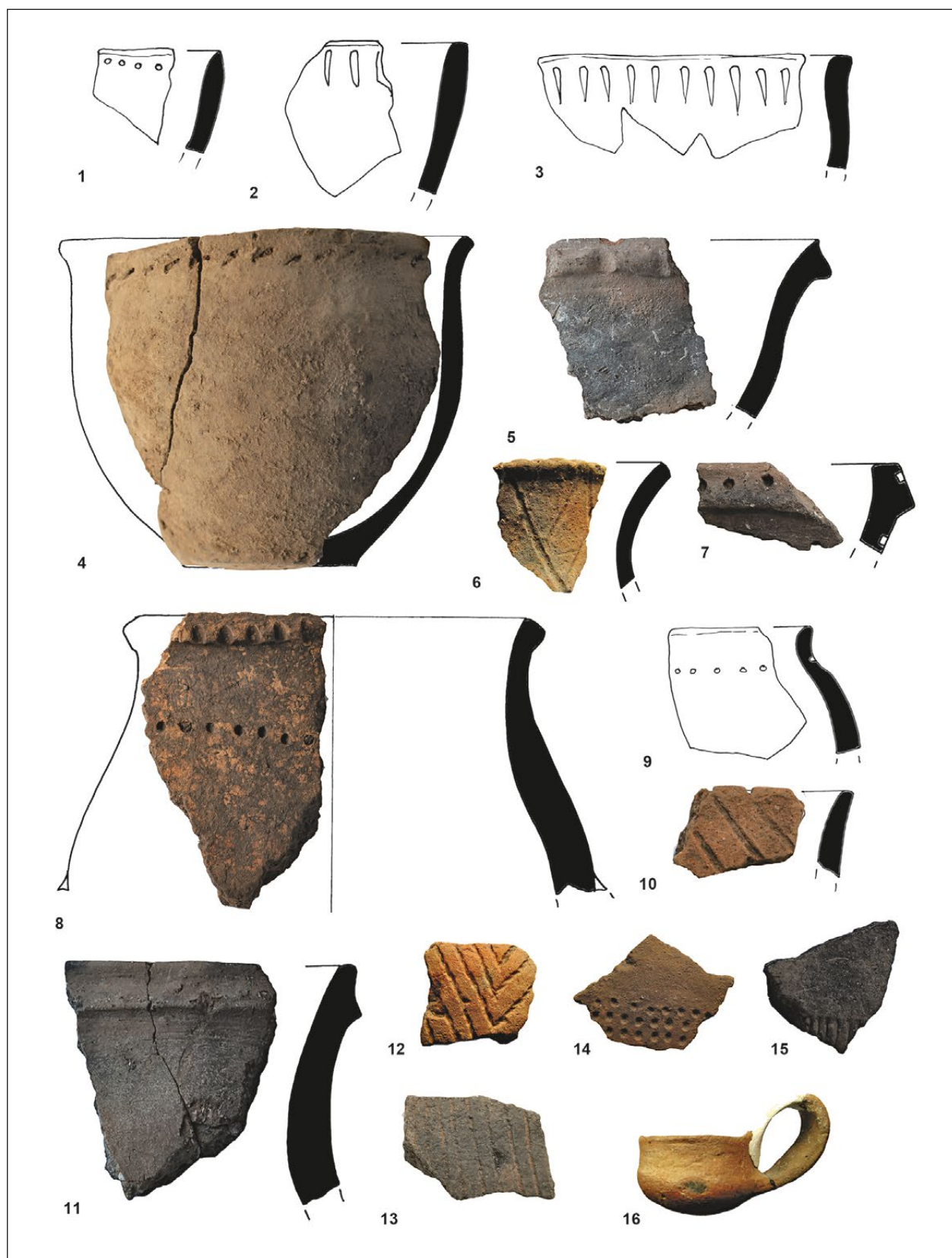


Fig. 6. Banjska Stena site, EBA pottery

Сл. 6. Бањска стена, керамика РБД

Middle Bronze Age (MBA) Occupation

The next cultural horizon corresponds to the Middle Bronze Age. A robust 1-metre-thick stone rampart was constructed, associated with features SU20 and SU22 (Fig. 5), consisting of soft, ashy soil with pottery, antler tools, and a fireplace. Diagnostic pottery includes a triangular-section handle with incised decoration (Fig. 7/1) and a rim with a small extension handle (Fig. 7/2). Similar handles occur at several locations in northeast Serbia and neighbouring regions of central Serbia and Banat, including Trnjane,⁶⁸ Ružana,⁶⁹ Ljuljaci,⁷⁰ Donja Varoš in Pančevo,⁷¹ Najeva Ciglana,⁷² and Măeăcine-Săliște in Romanian Banat (Verbicioara culture).⁷³ The analogies for the second diagnostic piece (Fig. 7/2) are finds from the sites of Ružana,⁷⁴ Velika Humska Čuka,⁷⁵ Striža,⁷⁶ and Vinča.⁷⁷

Regarding the stylistic traits of pottery, the material from the Middle Bronze Age (MBA) sites in north-eastern Serbia can be linked to the Bubanj-Hum IV-Ljuljaci cultural complex, according to the periodization proposed by A. Bulatović and J. Stankovski.⁷⁸ Typical are S-shaped pots with pronounced, plastically modelled rims (Fig. 7/3), conical and globular bowls (Fig. 7/4, 1, 5–6), and cups and beakers featuring a specific type of wishbone handle and three horn-shaped handles (Fig. Fig. 7/7,8,14). Most of the cups and beakers are decorated with incised ornaments, including a net-line motif arranged in strips (Fig. 7/5, 10–11). Also belonging to this category is an almost complete bowl found on the surface, decorated with incised net motifs, which exemplifies the decorated pottery from the first MBA phase at the site (Fig. 8/3).⁷⁹ A similar decoration is also seen on an urn (grave 40) from the Magura cemetery near Felix Romuliana (Fig. 8/5).⁸⁰ Likely from this settlement phase is a typical Vatin culture beaker from D. Sreјović's excavations in the 1990s (Fig. 8/2).⁸¹ It is important to note that, aside from a few beakers, triangular rim extensions are absent in Banjska Stena, whereas in neighbouring MBA sites such as Ružana,⁸² Ljuljaci,⁸³ Sokolica,⁸⁴ Popovica,⁸⁵ Bubanj, and Velika Humska Čuka⁸⁶ such plastic ornaments represent one of the most indicative traits.

In addition to the pottery finds that support dating this specific phase in Banjska Stena to the early Middle Bronze Age, there is also a radiocarbon date from an animal bone discovered in SU22. The date (VERA-8027) has an absolute age of 3393 ± 31 , with a calibrated range of 1769 to 1611 BC (93%), which spans the period from the middle of the 18th century to the late 17th century BC (Fig. 11).

Later Middle Bronze Age:

Fortification and Material Culture

The subsequent MBA phase is represented by light-brown soil with organic residues (SU7, 13, 15, 19) and evidence of fortification repair, including larger stones set on top of the wall with reddish clay (Fig. 9). Unique among the Middle Bronze Age sites in north-eastern Serbia, the fortification aimed to restrict easy access to the upper plateau from the west. The pottery spectrum reveals minor differences compared to the previous phase. Notably, there is an increased occurrence of horizontal and cylindrical-shaped handles (Fig. 7/13), which, along with those from Banjska Stena and Magura (Fig. 8/4–7), also appear sporadically at Čoka Njica, Rgotina, Gornja Bela Reka, Kadijski Krst,⁸⁷ Popovica,⁸⁸ Humska Čuka, and in north-western Bulgaria, particularly at the Gramada and Antimovo sites near Vidin.⁸⁹ This handle type is very common for urns from Magura but is absent from any urn necropolises surrounding Bor.⁹⁰ Other pottery finds from this phase include s-shaped goblets and bowls (Fig. 7/15), globular bowls (Fig. 7/10, 11), cups, and beakers with a specific wishbone-shaped handle (Fig. 7/9, 14, 18). This phase also yielded several three-horn handles (Fig. 7/8) and a miniature decorated conical lid featuring

⁶⁸ Kapuran et al. 2020, Pl. III/14.

⁶⁹ Kapuran et al. 2016, T. 2/7.

⁷⁰ Богдановић 1986, кат. 47.

⁷¹ Grčki-Stanimirov 1996, T. I/7; T. II/7.

⁷² Радојчић 2013, кат. 155.

⁷³ Guma 1997, Pl. LIIc/9.

⁷⁴ Kapuran et al. 2016, T. 2/7.

⁷⁵ Булатовић, Станковски 2012, T. III/21.

⁷⁶ Стојић, Јоцић 2003, T. XCIII/1.

⁷⁷ Tasić 1984, Taf. XV/9.

⁷⁸ Булатовић, Станковски 2012.

⁷⁹ The bowl was found by Aleksandar Saša Rakezić, who also participated in the excavations.

⁸⁰ Срејовић, Лазих 1997, sl. 32.

⁸¹ Срејовић, Лазих 1997, sl. 69.

⁸² Kapuran et al. 2016.

⁸³ Богдановић 1986.

⁸⁴ Стојић 2000.

⁸⁵ Милојевић, Капуран 2023.

⁸⁶ Булатовић, Станковски 2012.

⁸⁷ Срејовић, Лазих 1997, sl. 20, 22, 24, 79, 80–81.

⁸⁸ Милојевић, Капуран 2023.

⁸⁹ Александров, Даскалов 2005; For the information about the presence of MBA pottery at the Gramada site we are thankful to Dr Georgi Ivanov.

⁹⁰ Срејовић, Лазих 1997, sl. 30, 32, 33; Kapuran et al. 2022.

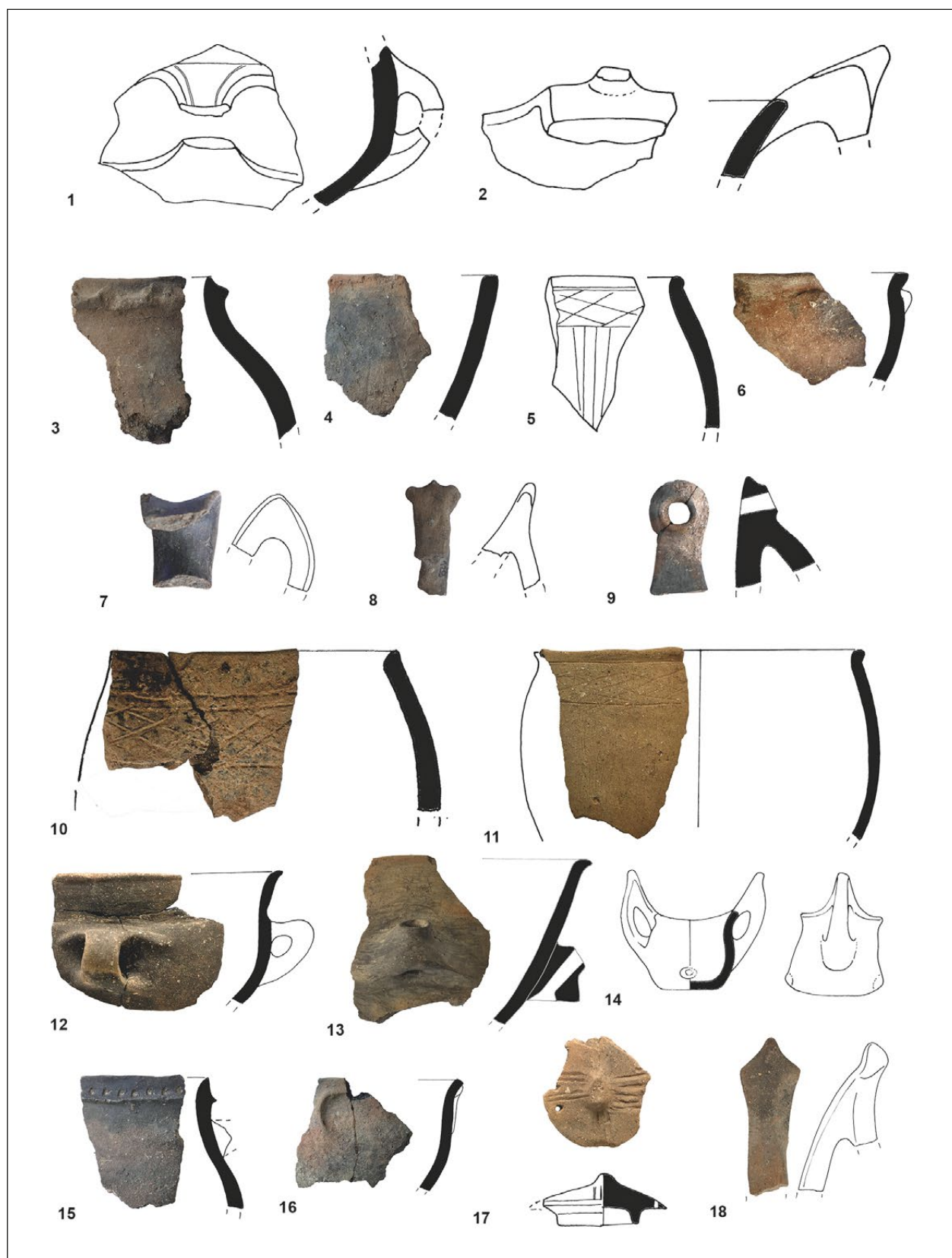


Fig. 7. Banjska Stena site: 1–9) pottery from the earlier MBA phase; 10–18) pottery from the younger MBA phase

Сл. 7. Бањска стена: 1–9) керамика старије фазе СБД; 10–18) керамика млађе фазе СБД

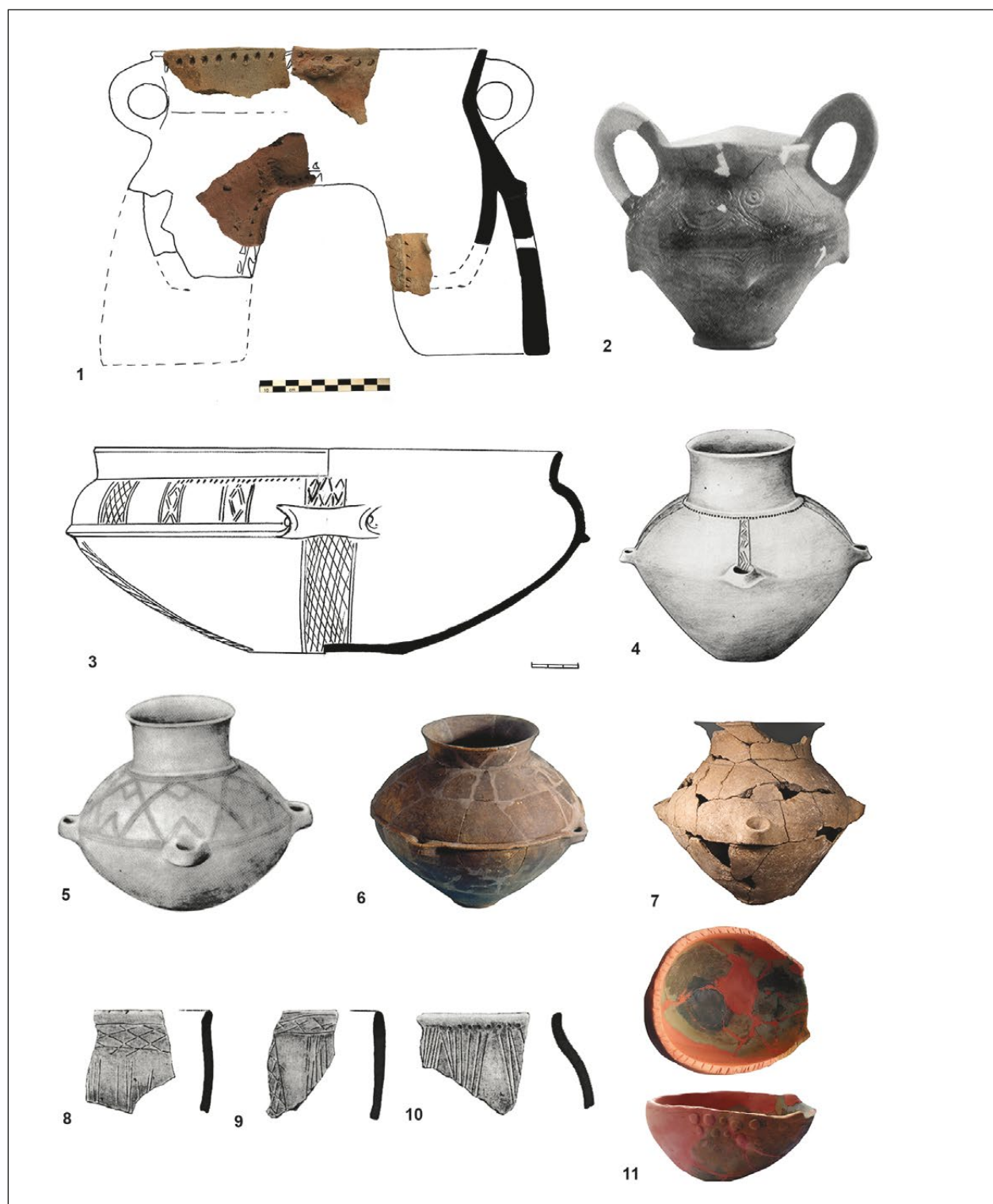


Fig. 8. Banjska Stena site: 1) Pyraunos from cenotaph in Tr 1/2022; 2) Vatin-type beaker from the 1996 excavations; 3, 11) Bowl and sosiera from A. Rakezić private collection (chance find); 4–7) Urns from Magura Necropolis; 8–10) pottery from the 1996 excavations

Сл. 8. Бањска стена: 1) Пираунос из кеноџафа у сонди 1/2022; 2) Вајтински њехар са исцртавања из 1996; 3, 11) Здела и сосијера из приватне колекције А. Ракезића (случајни налази); 4–7) Урне са некрополе на Мајури; 8–10) Керамика са исцртавања 1996. године

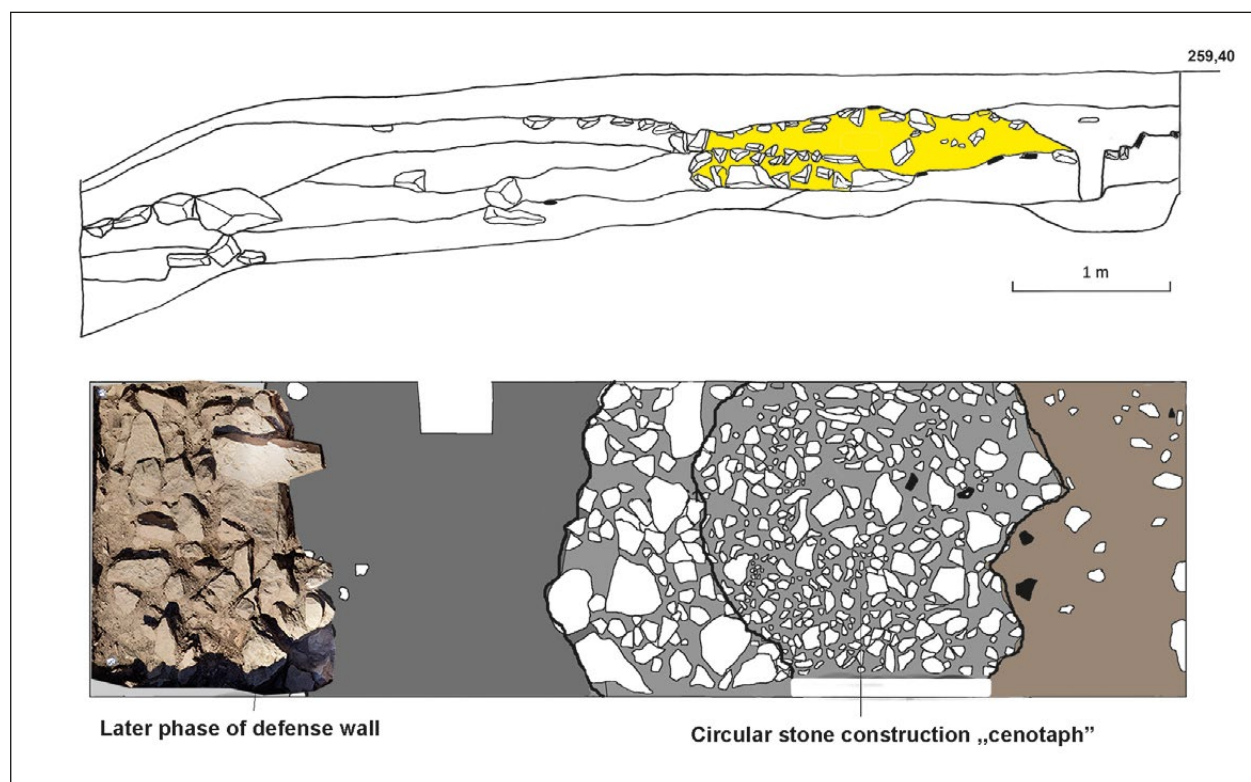


Fig. 9. Banjska Stena site: a) Image of the northern profile Tr 1/2022; b) Defensive wall and cenotaph in Tr 1/2022

Сл. 9. Бањска стена: а) северни профил сонде 1/2022; б) одбрамбени зид и кеноџаф у сонди 1/2022

perforations on the rim (Fig. 7/17). A new trend in decoration involves plastic applications, often used on storage vessels and pyraunoi, and also appearing on bowls, mainly in relation to handle ornaments. In fact, much of the ceramic repertoire from this phase does not show significant differences from the material already presented in the initial research report of the 1990s.⁹¹

From the features (SU7, 13, 15, and 19) assigned to the younger phase of the MBA settlement in Banjska Stena, we obtained one radiocarbon date from an animal bone. A radiocarbon date from SU7–19 (VERA-8024) indicates 3294 ± 31 BP, calibrated to 1627–1499 BC (Fig. 11), approximately 100 years later than the earlier MBA phase. Decorative motifs, including parallel incised lines, hatched motifs, and triangles (Fig. 8/3, 8–10), reflect influences from the Verbicioara culture (Oltenia) and are comparable to Mokranjske Stene and Iron Gates sites such as Mala Vrbica,⁹² Velesnica,⁹³ Boljetin,⁹⁴ Manastir-Gospođin Vir⁹⁵ and Ostrovul Corbului.⁹⁶ Based on the current picture, during the later stages of the Middle Bronze Age, the area around Gamzigrad, including the Banjs-

ka Stena site, which is the most crucial site, received cultural influences from the east (Verbicioara culture) and the west (Vatin culture), a point already emphasized by the authors who conducted investigations in the 1990s.⁹⁷ However, they introduced the term “Gamzigradska culture” to describe Bronze Age developments on a regional level, particularly in Banjska Stena. Today, we have the data that certain elements, such as handles in the shape of small recipients, that are thought to be specific to “Gamzigradska culture” appear not only in the Timok valley, but also on other sites such as Popovica, Velika Humska Čuka, Čoka Njica, and Antimovo in Bulgaria. Hence, such

⁹¹ Срејовић, Лазих 1997, сл. 29–34.

⁹² Вукмановић, Поповић 1984; Vukmanović, Popović 1986.

⁹³ Kapuran 2014, T. 19/20–23.

⁹⁴ Ajdić 1968, 82–83, T. XXVIII

⁹⁵ Brukner 1968, 97–99, T. XXXIV; Brukner 1969, 136–139, T. XXXVII.

⁹⁶ Crăciunescu 2004, Pl. III.

⁹⁷ Срејовић, Лазих 1997, 238.

handles are not typical of one specific region or “culture” but represent the general trend in pottery production during the late stages of the Middle Bronze Age across a larger territory between eastern Serbia and western Bulgaria.

In Trench 1, on the horizon of the later Middle Bronze Age, we also encountered an unusual structure made of circularly arranged stones with a diameter of four metres (Fig. 9). The larger stones formed the outer circle, while smaller stones filled the centre. Across the surface of this construction, we found numerous pottery fragments and animal bones. Visually, this feature closely resembled the grave constructions from the urn cemetery of Magura,⁹⁸ as well as from all Middle Bronze Age cemeteries around the city of Bor (Trnjane, Čoka Njica, Kriveljski Kamen and Borsko jezero).⁹⁹ However, in the construction at Banjska Stena, there were no urn fragments or cremated human bones. Instead, we discovered many fragments of decorated pyraunoi scattered across the structure, which may have resulted from intentional (ritual) breaking (Fig. 8/1). Throughout Bronze and Early Iron Age Europe, pyraunoi, as portable heaters, represented an important part of household inventories, as shown in several regional studies.¹⁰⁰ Additionally, the stratigraphical position of the construction at Banjska Stena is significant as one of the latest activities in the Middle Bronze Age settlement. Therefore, the possibility that the circular, grave-like stone structure (“cenotaph”) was built as one of the final acts of the Middle Bronze Age occupation of the site should not be overlooked, symbolically marking the abandonment of the settlement.

After a nearly 1,000-year hiatus, a new settlement emerged on the Banjska Stena plateau, fortified with an earthen rampart and wooden palisade, later destroyed by fire. Evidence includes a cohesive layer of hard, red, burnt earth with post remnants. This type of fortification could have been part of the La Tène occupation, confirmed by an abundance of wheel-thrown pottery on the surface and one fibula that has no parallels in Serbia.¹⁰¹ The Iron Age presence at the site is also indicated by one absolute date from the animal bone found in, apparently, a secondary position on the top of the MBA layer. With an absolute age of 2483±30 BC and a calibrated range between 773 and 480 BC, this sample (VERA-8025) falls into the Hallstatt plateau. Although there are currently no finds from Banjska Stena that could be assigned to this period, the investigations in the immediate surroundings brought clear

evidence about the site’s dating to the Early Iron Age.¹⁰² Life at this site continued during Late Antiquity. In our excavations from 2022, we uncovered two waste pits dating to this period.

Conclusions

Our joint research over the past seven years has substantially advanced the understanding of Bronze Age communities in north-eastern Serbia, particularly regarding their economy, burial practices, and connections to neighbouring regions. Fieldwork in 2022 focused on the Banjska Stena hillfort, a unique fortified site, with the primary aim of documenting stratigraphy, establishing occupation phases, and collecting samples for radiocarbon dating. To provide a broader regional perspective, we also incorporated data from the neighbouring Sokobanja Valley, particularly from the Popovica hillfort.¹⁰³

Earlier investigations had concentrated on smaller, unfortified copper-producing settlements and their associated urn cemeteries. The study of Banjska Stena and Popovica allowed us to expand this picture, providing insight into fortified, multi-layered sites whose occupation and economic context were not primarily linked to copper production. In contrast, sites around Bor clearly demonstrate that accessible mineral resources drove settlement patterns, while the factors motivating hilltop occupation at Banjska Stena and Popovica remain less immediately apparent. Limited documentation of similar sites in eastern Serbia, such as Čoka lu Balaš¹⁰⁴ and Četaće-Kovilovo¹⁰⁵ has complicated interpretation, while data from Mokranjske Stene offered only a partial insight due to the restricted excavation area and later disturbances.¹⁰⁶

In the case of Popovica, the primary motive for establishing the settlement was undoubtedly the site’s

⁹⁸ Lazić 2016.

⁹⁹ Kapuran 2017; Kapuran et al. 2022; Gavranović et al. 2025.

¹⁰⁰ Hochstetter 1984; Fischl et al. 2001; Andreou 2018.

¹⁰¹ Сладић 2003.

¹⁰² Kapuran 2014, 75–76, Map. 4; Kapuran, Шкундрић 2009, Map 2, 258–260.

¹⁰³ Project: Archaeological investigations of Early Iron Age sites on the territory of Sokobanja Municipality, PI P. Milojević, Project member: A. Kapuran.

¹⁰⁴ Tasić 1982.

¹⁰⁵ Трбуховић, Вуковић 1967.

¹⁰⁶ Капуран, Јањић 2015.

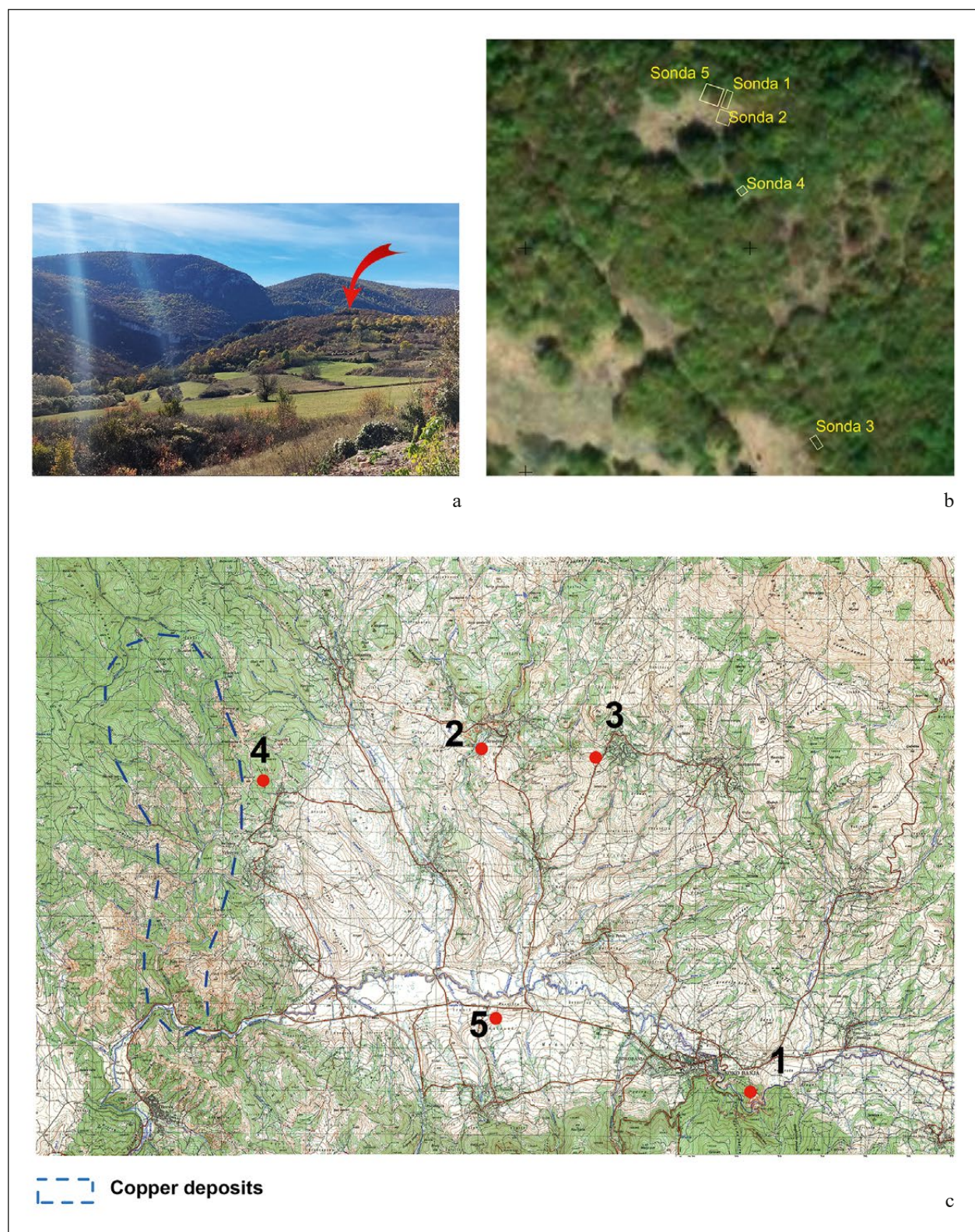


Fig. 10. a) Popovica hillfort; b) Distribution of the trenches;

c) 1. Popovica, 2. Devojački kamen, 3. Međukamenje, 4. Rujevačko gradište, 5. Trebić

Сл. 10. а) Поповица; б) Распоред сонди;

ц) 1. Поповица, 2. Девојачки камен, 3. Међукамење, 4. Рујевачко градиште, 5. Требић

strategic position, which allowed for better control of the Sokobanja Basin and the main communication route in the west-east direction (Fig. 10b). Interestingly, the medieval fortress of Sokograd was constructed on the opposite side of the Moravica Canyon, in a location much better naturally protected by the vertical cliffs, but where the valley could be controlled to a much lesser extent. This may suggest that the location of the prehistoric settlement was not subjected to significant external threats. The site's configuration, with natural protection (steep access) only on the southern side, supports this assumption.

During the EBA1 period in Popovica, the houses were likely arranged along the inner side of the rampart. At other similar sites in north-eastern Serbia, located in hard-to-reach areas such as Kulmja Škorpulji, Pjatra Kosti, and Jezero (Majdanpek), the houses were built into the slope but partly rested on the bedrock, which served as their foundation.¹⁰⁷ Many EBA1 settlements in north-eastern Serbia were established in strategically significant locations along river courses amid limestone rocks, which made additional fortifications almost unnecessary.¹⁰⁸ These habitats were likely used seasonally, possibly in the context of transhumance, moving livestock to higher pastures during summer.

Neither Banjska Stena nor Popovica show evidence of violent destruction or fire. The absence of substantial residential structures and fortification damage indicates abandonment rather than conflict. The small scale of these sites also suggests that they were not primarily livestock enclosures, despite the significant role of domestic animals in the EBA1 economy—accounting for 80% of the diet at sites such as Mokranjske Stene and Bubanj.¹⁰⁹

It is plausible that the fortifications, particularly at Popovica, served symbolic purposes, demonstrating power and visibility within the landscape. The selection of white limestone pebbles from the Moravica river enhanced the visual prominence of the site. The Popovica hillfort, located on the eastern edge of the Sokobanja valley and surrounded by mountain ranges, had full access to local resources, including clay deposits, river silt, and thermal springs, which may have had both practical and ritual significance.

Copper deposits in the Mratinja river basin and along the southern edges of Mount Bukovik (Fig. 10/c) represent a resource worth highlighting (Fig. 10/c).¹¹⁰ Although no evidence for local copper metallurgy was recorded at Popovica, numerous copper

axes and daggers have been found in the vicinity, suggesting that the search for metal resources may have contributed to settlement in the Sokobanja valley, analogous to conditions in the Iron Gates hinterland and at Bubanj-Salcuța-Krivodol and Coțofeni-Kostolac communities.¹¹¹

EBA1 sites along the Sokobanja valley perimeter indicate control over pastures and possibly ore deposits, with Popovica serving as a central point for regulating resource distribution. The proximity of thermal springs may have reinforced the site's importance, as such locations often held sacred or healing significance, motivating continued occupation,¹¹² leading to the construction of chapels, churches, holy sites, and memorial fountains next to the springs.¹¹³ This might also be a crucial reason why Popovica, among all the hills surrounding the valley, was selected as a site of control settlement.

Several studies have addressed the role and significance of the Banjska Stena hillfort during the Bronze Age in the middle course of the Crni Timok river.¹¹⁴ To express their gratitude to one of the most influential archaeologists in Serbia, D. Srećević's assistants often presented Magura and Banjska Stena as key sites of the so-called "Gamzigradska group," which is viewed as a significant Bronze Age cultural phenomenon in north-eastern Serbia.¹¹⁵ We believe it is more fitting to consider the "Gamzigradska group" as a local phenomenon within a much larger cultural framework known as the Bubanj - Hum IV - Ljuljaci complex, which encompasses most of the Middle Bronze Age developments in the central Balkans.¹¹⁶ In north-eastern Serbia, particularly around Banjska Stena, the aforementioned interactions and exchanges with the Vatin group to the north and the Verbicioara group to the east are also evident.

¹⁰⁷ Tasić 1982, 24.

¹⁰⁸ Капуран, Булатовић 2012.

¹⁰⁹ Булатовић, Милошевић 2015, 51, сл. 7.

¹¹⁰ Veselinović et al. 1970.

¹¹¹ Капуран, Булатовић 2012; Kapuran 2014; Kapuran 2014a.

¹¹² Милојевић 2023.

¹¹³ Влаховић 1930; Петровић 1932.

¹¹⁴ Срејовић, Лазих 1997; Лазих 1998; Лазих 2004; Kapuran 2009a; Kapuran 2014; Kapuran 2014a; Kapuran 2020; Kapuran et al. 2022.

¹¹⁵ Лазих 1998.

¹¹⁶ Булатовић, Станковски 2012.

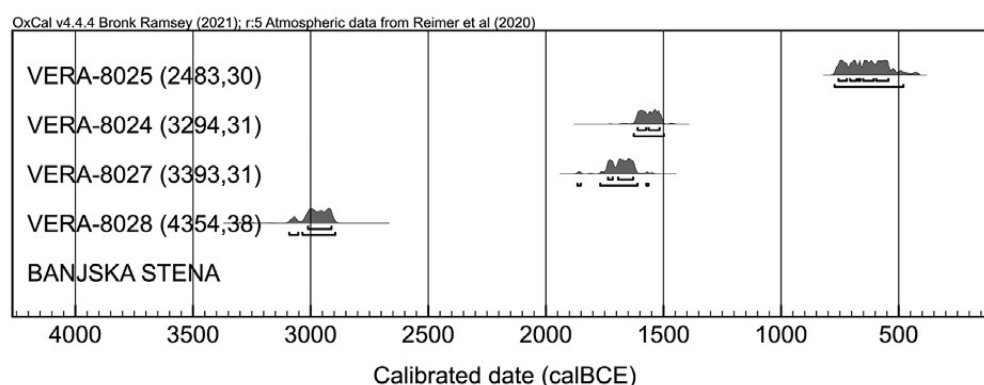


Fig. 11. Absolute dates from Banjska Stena excavations in 2022

Сл. 11. Абсолютни датуми са истраживања из 2022. године

Banjska Stena dominates the landscape along the Crni Timok river, with strategic access to the valley and cliffs rising on two sides. The Middle Bronze Age stone rampart on the west side distinguishes it from all other regional sites, which are smaller and less fortified.¹¹⁷ The analysis of material culture has also indicated a specific stratification and diversity of finds that is unmatched by any of the local sites. Following two systematic surveys of the Draganovo Potok basin, located on the right bank in the central stretch of the Crni Timok river, a much clearer picture of the distribution of MBA sites in the vicinity of Banjska Stena has emerged.¹¹⁸ In total, there are 57 sites from this period, including the urn cemetery of Magura and individual burials uncovered during the investigations of the Roman palace of Felix Romuliana, as well as in Zvezdan village and at the Pišura Česma site near Zaječar.¹¹⁹ Overall, the distribution of these sites clearly indicates dense occupation in this area during the Middle Bronze Age (Map 2). Such intense settlement in the Draganovo Potok region suggests developed resource management with a combination of agricultural and pastoral economies, along with several smaller settlements or hamlets located in close proximity (approximately 500 m from site to site). In contrast, the sites around the city of Bor are situated on infertile soil. Nevertheless, they appear to consist of mining and metallurgical communities motivated primarily by the closeness of ore deposits and the potential to produce large quantities of charcoal essential for metal smelting. In the case of settlements near Banjska Stena, surveys and small-scale excavations confirm that only at the Selište and Varzari sites were traces of metallurgical activity, including metal slags similar to

those from the Bor area,¹²⁰ recovered. Metallurgy seemingly was not the primary occupation of Middle Bronze Age sites around Banjska Stena, as these communities were more focused on agriculture and husbandry.

A couple of absolute dates from the Middle Bronze Age layers in Banjska Stena (Fig. 11) are somewhat younger than the vast majority of dates from sites in the Bor area.¹²¹ The only site that might partially overlap with Banjska Stena is Čoka Njica. In addition to the overlapping radiocarbon dates, there are also some finds from Čoka Njica that resemble the ceramic repertoire from Banjska Stena, including handles with cylindrical recipients and a goblet indicative of the Verbicioara culture.¹²² This is why we previously argued that the Vatin (Ljuljaci) and Verbicioara cultures significantly influenced the development of the Middle Bronze Age in the central part of the Crni Timok river flow. In light of new developments, the Middle Bronze Age in north-eastern Serbia can be regarded as a part of Bubanj–Hum IV cultural complexes¹²³

A comparison of the material culture from the Middle Bronze Age horizons at Banjska Stena with finds from surrounding sites shows that the ceramics from the hillfort are more elaborately decorated, ex-

¹¹⁷ Kapuran 2014; Kapuran 2014a.

¹¹⁸ Капуран, Шкундрић 2009; Капуран 2014.

¹¹⁹ Kapuran 2014, 58.

¹²⁰ Mehofer et al. 2021.

¹²¹ Gavranovic et al. 2025.

¹²² Срејовић, Лазић 1997.

¹²³ Булатовић, Станковски 2012, 343.

cept for one site at the entrance to the village of Zvezdan.¹²⁴ This is especially true for bowls and goblets adorned with incised hanging hatched triangles and hatched bands, which are characteristic of the Verbioara culture, as well as horizontal handles with cylindrical recipients or wishbone-shaped three-horn handles on goblets. Aside from the Magura necropolis, this type of pottery does not appear at any neighbouring sites. This could provide further evidence for interpreting the Banjska Stena hillfort as an extraordinary local site, suggesting signs of social stratification within the Middle Bronze Age population. Perhaps, as a result, a formidable stone rampart was built to sym-

bolically highlight the special role of the inhabitants of Banjska Stena in the distribution of wealth in the Timočka Krajina region.

In conclusion, our integrated study of Banjska Stena and Popovica highlights the diversity of Bronze Age settlement strategies in north-eastern Serbia. Fortified hilltop sites were not primarily defensive or metallurgical, but served strategic, symbolic, and economic functions within the broader landscape. The evidence underscores the interplay between resource availability, strategic location, and social dynamics, contributing to a nuanced understanding of prehistoric communities in this region.

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¹²⁴ Kapuran 2014; Kapuran, Milojević 2020.

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ОБРАСЦИ НАСЕЉАВАЊА ТОКОМ БРОНЗАНОГ ДОБА У ИСТОЧНОЈ СРБИЈИ – НА ПРИМЕРУ ЛОКАЛИТЕТА БАЊСКА СТЕНА И ПОПОВИЦА

Кључне речи. – североисточна Србија, рано и средње бронзано доба, насеља, фортификација, Бањска стена, Поповица, обрасци насељавања

Хронолошки оквир металних доба у праисторији на тлу Србије доскора је био неусклађен у односу на периодизације које су важиле у археолошким школама на истоку и југу Балканског полуострва, нарочито када је реч о периодизацији бронзаног доба. Важно је нагласити да је захваљујући студији А. Булатовића, М. Гори и М. Вандера Линдена из 2020. године, почетак бронзаног доба у Србији најзад усклађен са хронологијама које су важиле у Бугарској и Грчкој, тако да почетак бронзаног доба представља прелаз из 4. у 3. миленијум п. н. е. Континуитет насељавања источне Србије почиње са културом Бубањ–Салкуца–Криводол или Бубањ – Хум I (од 4400. до 3600. године п. н. е.). На локалитетима ове културне групе крајем 3. миленијума формирају се насеља Коцофени–Костолац културе, чији припадници највероватније упражњавају трансхуманцу као начин економије, о чему најбоље сведоче геоморфолошке карактеристике ових насеља. Захваљујући апсолутним датумима можемо закључити да су заједнице културе Коцофени–Костолац населиле тло североисточне Србије највероватније под утицајима великих кретања популација из евроазијских степа негде од средине па до самог краја 3. миленијума п. н. е. Средње бронзано доба на истом простору почиње на прелазу из 3. у 2. миленијум п. н. е. када се у већем степену користе предмети од калајне бронзе. Засад је познато да је током раног и средњег бронзаног доба на подручју источне Србије само у два случаја праисторијско насеље било опасно бедемом, док је за насеље Чока лу Балаш остало недовољно јасно из ког периода потиче фортификација, будући да истраживачи нису за ту тврдњу предочили никакве доказе (фотографије или скице).

Праисторијско насеље на локалитету Поповица код Сокобање формирано је крајем 3. миленијума п. н. е., и у тој најранијој фази стратиграфски се издвајају два нивоа са остацима подница од стамбених објеката. Такође је констатовано да је у млађој фази доминације културе Костолац–Коцофени са северне стране насеље утврђено каменим сухозидом у виду моћне фортификације. Захваљујући стилско-типолошким карактеристикама керамике у културном слоју и у објектима, као и према апсолутном датуму, ово насеље настало је на самом почетку раног бронзаног доба, односно негде између 3100. и 2910. године п. н. е. Овом периоду одговарала би и једна остава секира типа патулеле, која је пре извесног времена откривена на око 200 м западно од локалитета, због чега је и одлучено да се предузму истра-

живања на овом локалитету. Следећа фаза насељавања на Поповици припада средњем бронзаном добу, о чему сведочи велики број посуда израђених у маниру културне групе Бубањ – Хум IV – Љуљаци. О најмлађим фазама насеља сведоче веома ретки налази керамике из позног бронзаног доба и нешто бројнија керамика која припада старијем гвозденом добу, али је ове хоризонте с временом однела ерозија. Поповица је лоцирана на источном ободу Сокобањске котлине, и осим минералних извора који се у обиљу налазе у њеном подножју, вероватно је имала и одређени стратешки значај, будући да се са њеног платоа веома добро контролишу комуникације које долињским системима воде до Књажевца на истоку или Алексинца на западу. Ипак смо више склонили закључку да је бедем можда био подигнут како би се истакао изванредан симболичан значај овог насеља за заједнице раног бронзаног доба у његовом окружењу.

Утврђено праисторијско насеље на Бањској стени код Гамзиградске бање (Зајечар), систематски и у већем обиму је истраживано током прве половине деведесетих година прошлог века, али су резултати ових истраживања публиковани у веома скромном обиму. Праисторијско насеље је највероватније настало крајем 5. миленијума п. н. е., о чему сведоче ретки фрагменти керамике културе Бубањ – Хум I, која је у том периоду доминирала на територији централног Балкана. Трагове овог насеља нисмо могли да констатујемо у археолошком запису и у оквиру габарита сонди наших ревизионих ископавања, будући да су највероватније били или ерозијом однети или девастирани током каснијих фаза изградње насеља на овом релативно малом платоу који се уздиже изнад великог меандра Црног Тимока. Живот на локалитету се наставља и у раном бронзаном добу, односно током доминације културе Коцофени–Костолац, о чему најбоље сведочи и апсолутни датум који показује да је у питању период између 3035. и 2895. године п. н. е. Након хијатуса од око скоро једног миленијума, следе две фазе насељавања током средњег бронзаног доба (Бубањ – Хум IV – Љуљаци), када је са западне приступачне стране ово насеље први пут заштићено импозантним каменим бедемом, према апсолутним датумима највероватније изграђеним у периоду између 1769. и 1611. године п. н. е. Друга фаза насеља током средњег бронзаног доба може да се датије у период између 1627. и 1499. године п. н. е. Овај датум уједно кореспондира и са једином датумом добијеном на некрополи Магура, која је по свему судећи била место на коме су се

сахрањивале заједнице које су живеље на Бањској стени. У питању је некропола са кремираним покојницима сахрањеним у урни која се налазила у центру кружних камених конструкција. Ова некропола се налазила на платоу брда Магура, које се пружа северно од изнад римске царске палате Феликс Ромулијана, и на истом месту су касније такође били сахрањени император Галерије и његова мајка Ромула. Занимљива је чињеница да су становници Бањске стене пре напуштања свог насеља унутар бедема подигли један кенотаф (гроб без покојника), идентичне форме као кружни камени гробови на Магури, којим су на симболичан начин означили напуштање овог простора. Након извесног времена локалитет су као привремено станиште највероватније користиле популације из старијег гвозденог доба, о чему сведочи још један апсолутни датум који показује да се радило о „халштатском платоу“, будући да су вредности показивале да је у питању период између 773. и 480. године п. н. е. Убрзо након тога на Бањској стени и Келти подижу своје насеље заштићено новом фортификацијом, али овога пута у виду палисадног бедема од дрвета и земље, који је страдао у неком великом пожару. После Келта овај локалитет користе Римљани, о чему сведоче две отпадне јаме које су се такође налазиле у делу насеља унутар бедема.

Захваљујући већем броју истраживања и добијеним апсолутним датумима, слика о насељавању источне Србије током бронзаног доба је знатно промењена у односу на ситуацију од пре једне деценије. Док су ранија истраживања сведочила о малом броју насеља у овом делу Србије, нова истраживања су допринела да се добије нов увид у извесне групе насеља које су током раног бронзаног доба (Коцофе-

ни–Костолац) упражњавале искључиво пасторалну економију, док су тек у веома ретким случајевима упражњавале металургију бакра. Зооархеолошка истраживања су показала да око 80% животињских костију са појединих локалитета из овог периода представљају доместификоване врсте животиња. Због те чињенице логично је закључити како њихова насеља првенствено имају стратешки карактер, односно усмерена су ка контроли територије преко које се сезонски крећу њихова стада, што се најбоље може видети у случају Поповице. У случају Бањске стене и даље је остало нејасно из каквих побуда је дошло до изградње моћног бедема током средњег бронзаног доба. На основу анализе материјалне културе са истовремених околних насеља може се закључити да на простору десне обале Црног Тимока и његових притока доминирају пољопривредна производња и сточарство, а да је металургија бакра констатована само у два случаја.

Као закључак студије о локалитетима Поповица и Бањска стена можемо рећи да су предузета истраживања довела до доказа да ова утврђена насеља примарно нису била окренута нити металургији нити сточарству и пољопривреди, већ су више имала симболичну улогу у простору на којем су настала. Чињенице прикупљене приликом систематских и ревизионих истраживања на овим насељима такође указују на извесну интеракцију између доступности природних ресурса, њихове стратешке позиције и друштвене динамике која је у источној Србији владала током бронзаног доба, као и да је вероватно постојала веома жива интеракција између заједница окренутих пољопривреди и сточарству, и заједница фокусираних на металургију бакра.

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CHILDHOOD IN BATINA AT THE END OF THE LATE BRONZE AGE AND THE BEGINNING OF THE EARLY IRON AGE

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Abstract. – Batina is a multi-layered site situated on a prominent position above the Danube on BANSKO BRDO in Baranja. This site holds particular significance for understanding the broader picture of settlement in the Middle Danube region during the Late Bronze Age and the beginning of the Early Iron Age, from the 11th to the 7th century BC. Numerous chance finds described in the literature are housed in nine different museums across Europe. Recent excavations, conducted since 2010 at the Sredno locality, have uncovered a flat cremation cemetery dated to the Late Bronze Age and the beginning of the Iron Age, with evidence of burials under tumuli dated to the beginning of the Iron Age. A child-centred perspective was applied in the study of children's traces at the Batina site. The collected traces of children (osteological remains from graves and archaeological artefacts) were compared with what is already known about the life of the Late Bronze and Early Iron Age community at Batina, as well as with contemporary sites at Sotin and Doroslovo in the vicinity within the Danube region.

Key words. – Batina, Danube region, Late Bronze Age, Early Iron Age, graves, chance finds, children, childhood, identity, diet

Batina is a multi-layered archaeological site located on a prominent position above the Danube, at the north easternmost edge of the hill of BANSKO BRDO in Baranja (Fig. 1). It is a significant site, as its research provides insights into settlement patterns during the Late Bronze Age and the beginning of the Early Iron Age, from the 11th to the 7th century BC.¹ Numerous chance finds, described in the literature, are housed in nine different museums across Europe.² Recent excavations, ongoing since 2010 at the Sredno locality, have uncovered a flat cremation cemetery dated to the Late Bronze Age and Early Iron Age, with evidence of burials under tumuli dated to the beginning of the Iron Age.³ Multidisciplinary analyses of material remains collected from the Batina cemetery have revealed numerous children's graves.⁴ Additionally, museums across Europe house earlier chance finds that can also be associated with children, based

on their form and size.⁵ The study of archaeological contexts and finds from Batina applies a child-centred theoretical framework, focusing on children and their perspectives⁶ – with all the challenges and unresolved questions surrounding the identification and definition of toys as the most recognizable category associated with children in archaeological contexts.⁷

This paper aims to reconstruct the life and death of children, based on data obtained by analysing osteological and archaeological material. The cemetery at

¹ Bojčić et al. 2018, 162; Dizdar et al. 2019.

² Metzner-Nebelsick 2002; Dizdar et al. 2021, 22–24.

³ Bojčić et al. 2018; Dizdar et al. 2019.

⁴ Ložnjak Dizdar, Rajić Šikanjić 2020.

⁵ Metzner-Nebelsick 2002, 595, T. 5, 6–9, *passim*.

⁶ Crawford 2009, 55.

⁷ Crawford et al. 2018, 17.

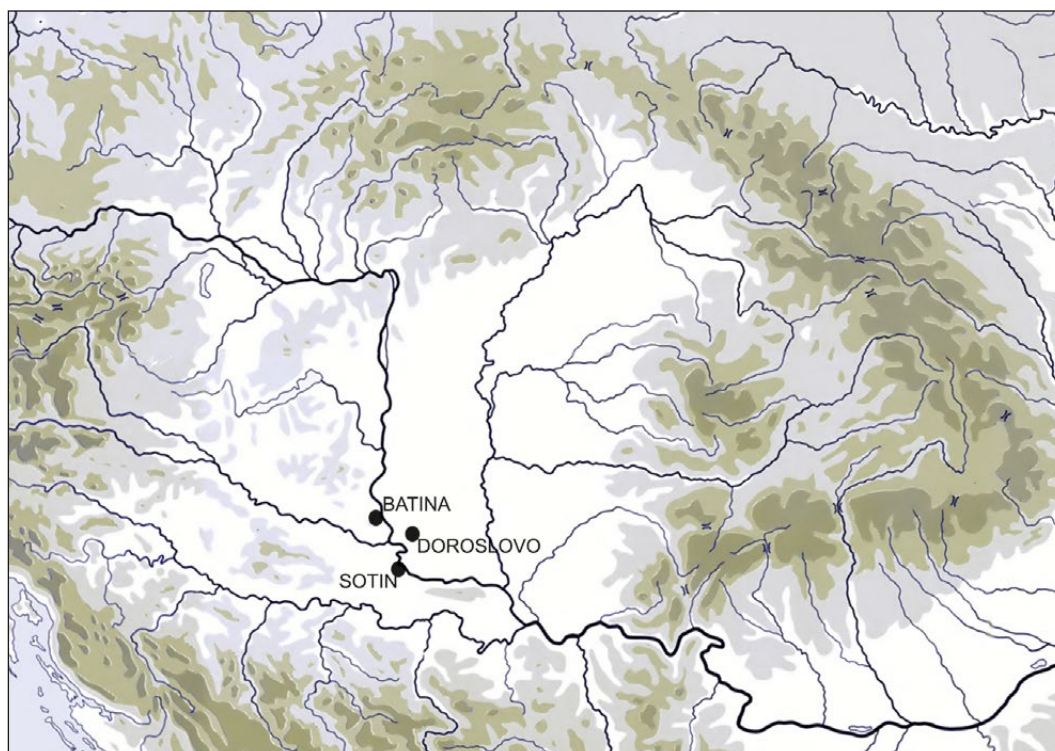


Fig. 1. Geographical location of Batina

Сл. 1. Географски положај Батине

Batina was chosen as a case study because the analysed graves include all biological and chronological age categories of children up to 20 years of age. The documented traces of children from examined graves and chance archaeological finds were compared with what is already known about the life of the Late Bronze and Early Iron Age community at Batina, as well as with the contemporary, geographically close sites at Sotin and Doroslovo. The further aim of this research is to identify differences and similarities between the Batina site and the region, and other contemporary sites in the broader area, from the perspective of the archaeology of childhood.

GEOGRAPHICAL LOCATION

The region of the Croatian Danube Basin and Syrmia is situated in the southern part of the Pannonian Plain and represents the easternmost part of the interfluvium between the Drava, Sava, and Danube.⁸ The northern part of the Croatian Danube Basin is Baranja, which forms a distinct geographical unit, with its eastern side oriented toward the Danube. The only elevation in Baranja, stretching in a northeast-southwest direction and

reaching the banks of the Danube, is BANSKO BRDO, with an altitude of 243 metres.⁹ It offers views of the flat Bačka region to the east and the Baranja plain to the south and north. Together with fertile soil and abundant water, this makes it an exceptionally attractive location for settlement and a strategic point in the landscape. These preconditions resulted in the long-lasting continuity of settlement in this area since the Neolithic, with the most numerous and rich finds coming from the fortified settlement of Gradac, dated to the 11th–7th centuries BC, with its flat cemetery and tumulus cemetery at the Sredno site.¹⁰ The settlement was located at the extreme north-eastern part of BANSKO BRDO, with its cemetery situated along a road leading westward to the settlement. After cremation, the deceased were predominantly buried in flat graves, while a few prominent members of the community were interred in burial chambers beneath earthen mounds – tumuli.¹¹

⁸ Bognar 1994, 25.

⁹ Bognar 1994, 30.

¹⁰ Bojčić et al. 2011.

¹¹ Dizdar et al. 2021, 47–48.

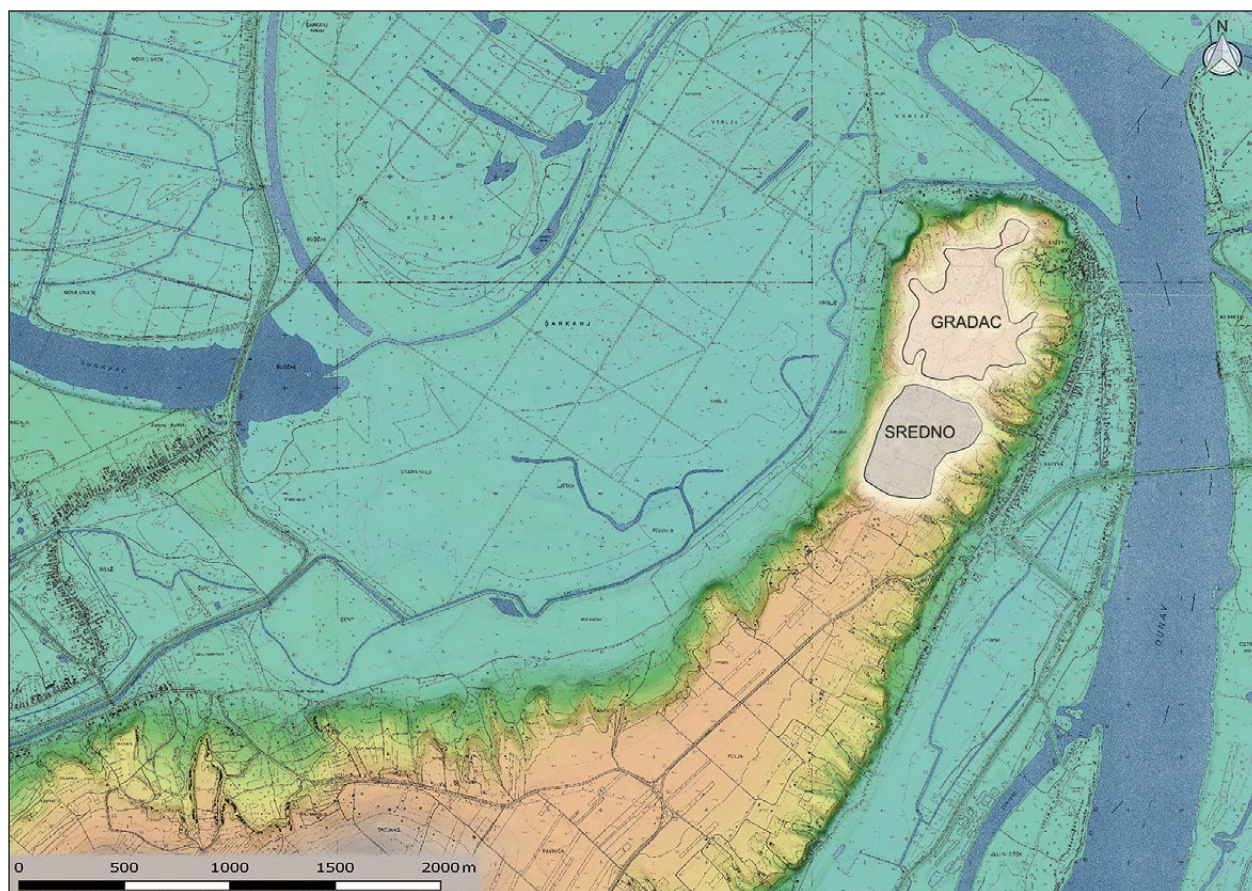


Fig. 2. Map of Bansko Brdo with position of Gradac and Sredno (Marin Mađerić for Institute of Archaeology)

Сл. 2. Карта Банској брда с позицијама Градац и Средно (Марин Мађерић за Институт за археологију)

HISTORY OF RESEARCH

At the beginning of the 20th century, a Late Bronze Age and Early Iron Age cemetery was discovered and unprofessionally excavated in Batina. Records from that time mention flat graves and tumuli, with cremation and inhumation burials. The graves contained ceramic vessels that served as urns or grave goods, along with bronze items such as fibulae, horse gear, bracelets, torcs, hair ornaments, pendants, animal figurines, and helmets.¹² In 1901, a hoard was likely discovered in Batina and subsequently purchased by the Hungarian collector Imra Frey. It consisted of a large number of bronze objects, including horse gear items such as psalia, bits, strap separators, buttons, and costume items like pins, fibulae, and pendants.¹³

Rescue excavations have been conducted in the Batina area for decades, while systematic investigations of the settlement took place between 1970 and 1972, through a collaboration between the Museum of

Slavonia in Osijek and the Smithsonian Institution. Systematic excavations at the Gradac site were carried out by an international team led by S. Foltiny and K. Vinski-Gasparini, which uncovered part of the Late Bronze Age and Early Iron Age settlement, including remains of above-ground houses, hearths, and pits, as well as parts of Roman architecture.¹⁴ Smaller rescue excavations at the same site were conducted in 1976 and 1977; in addition to ancient pottery, they identified two horizons of the Dalj group, along with evidence of La Tène pottery.¹⁵

¹² Vinski, Vinski-Gasparini 1962, 270, fig. 108–111.

¹³ Nađ I., Nađ P., 1964, 13–15, T. VI–XI, T. XII, 1–4, 6–8, T. XIII, 3, T. XIV, 1, 3–5, T. XV, 2, 4–6, T. XVI, 2, 6, T. XVII, 1–3, 5–6.

¹⁴ Bulat 1970, 43; Pinterović 1971, 55–56.

¹⁵ Minichreiter 1976, 38; Bojčić 1977, 42–43, T. XXIII, 3 – XXIV.

Rescue excavations at Gradac above Batina continued in 2002, investigating a part of the Late Bronze Age settlement: an above-ground house that had been destroyed by fire. The house was dated to the Ha A period.¹⁶ A part of the Dalj group settlement was excavated in the autumn of 2013, in the eastern part of the Gradac locality.¹⁷

Following a field survey, excavations began in 2010 to the west of the Gradac locality: at the Sredno locality, where remains of a Bronze Age and Iron Age cemetery were identified.¹⁸ Rescue excavations and archaeological surveys at the prehistoric settlement of Gradac and the Sredno cemetery continue to this day.¹⁹ The prehistoric cemetery has been continuously investigated since 2010, through a collaboration between the Archaeological Museum in Osijek/Museum of Slavonia, the Institute of Archaeology, and the Department of Archaeology of the Croatian Academy of Sciences and Arts (HAZU).²⁰ To date, excavations have discovered approximately 70 flat cremation graves and 3 tumuli, and identified the boundary between the settlement and the cemetery, along with a potential prehistoric south-eastern route leading from the Danube to the settlement. The excavated portion of the prehistoric cemetery at Batina is dated to the period from Ha A2 to Ha C2, that is, from the 11th to the 7th century BC.²¹

MATERIAL SOURCES

Material sources for studying childhood in the Middle Danube region during the 11th–7th centuries BC primarily consist of explored cemeteries and, to a lesser extent, settlements. At the Late Bronze Age and Early Iron Age cemeteries of Batina,²² Sotin,²³ and Doroslovo,²⁴ numerous children's graves have been investigated: a total of 42 graves. Five inhumation graves from the Doroslovo cemetery are dated later, to the late 6th and 5th centuries BC.

The mentioned cemeteries are attributed to the Dalj group, which characterizes the later phase of the Late Bronze Age and the initial phase of the Early Iron Age in the Croatian Danube region. The group is distributed from Baranja to western Syrmia, primarily along the right bank of the Danube, and in Bačka it extends to the left bank as well.²⁵ In contrast, N. Tasić argues that the Dalj group can be traced from Hungarian-Croatian Baranja, specifically in the north from a line south of the Mecsek mountains to the confluence of the Drava and the Danube, and in parts of western Syrmia and north-western Bačka.²⁶ The finds from

Dalj and Batina (Kisköszeg) were first classified by G. V. Childe within the framework of the “Pannonian group”.²⁷ The cemetery types of Dalj–Batina, Dalj, and Vukovar were designated by K. Vinski-Gasparini in 1973 as the *southern branch of related Danubian necropolises in Transdanubia and Lower Austria*, within the Urnfield culture in northern Croatia.²⁸ N. Tasić proposed using the name “the Dalj-Doroslovo culture” for the Dalj group, as Doroslovo is the largest systematically excavated cemetery of this group to date.²⁹ C. Metzner-Nebelsick attributes these sites to the south-eastern Pannonian group of the Urnfield and Hallstatt period.³⁰ The end of the Dalj group, as well as burials in long-lasting cemeteries such as Batina, Vukovar, Sotin and Doroslovo, are dated to the end of the 7th and the beginning of the 6th century BC.³¹

In the funerary practices of the Dalj group, bodies were cremated. This process significantly impacted the preservation of material traces, which are studied through interdisciplinary analyses.

A step in the research involves a comparison of Batina data with other contemporary communities in the geographically compact Danube region. These are large excavated cemeteries with more than one hundred graves: Sotin in Syrmia³² and Doroslovo in Bačka.³³

Excavations at the Sotin site between 2008 and 2018 uncovered 119 graves, dating from the 9th to the 7th centuries BC. Osteological analysis has been conducted on 47 graves, of which 16 belonged to children. In Doroslovo, approximately 180 graves were excavated, and anthropological analysis was per-

¹⁶ Šimić 2002, 58.

¹⁷ Vukmanić 2014; Dujmić 2021.

¹⁸ Bojčić et al. 2018; Dizdar et al. 2019; Dizdar et al. 2021.

¹⁹ Dujmić 2011; Dizdar et al. 2021.

²⁰ Bojčić et al. 2011.

²¹ Dizdar et al. 2019, 95–97; Dizdar et al. 2021, 19–24.

²² Rajić Šikanjić, Ložnjak Dizdar 2020; Dizdar et al. 2021.

²³ Ložnjak Dizdar 2019; Ložnjak Dizdar, Rajić Šikanjić 2020.

²⁴ Трајковић 2008.

²⁵ Vinski-Gasparini 1983, 601.

²⁶ Тасић/Tasić 1994, 12.

²⁷ Childe 1929, 407–409.

²⁸ Vinski-Gasparini 1973, 22.

²⁹ Тасић/Tasić 1994, 12.

³⁰ Metzner-Nebelsick 1996; 2002; 2017, 350, Fig. 1.

³¹ Vinski-Gasparini 1983, 604; Тасић/Tasić 1994, 12; Metzner-Nebelsick 2002, 178–179, Abb. 78.

³² Hutinec, Ložnjak Dizdar 2010; Ložnjak Dizdar 2019.

³³ Трајковић 2008.

formed on 89 graves, revealing 17 children.³⁴ The geographical proximity and contemporaneity of the sites allow for a more detailed comparison of the research topics across the sites, encompassing different landscapes of this part of the Middle Danube region. The state of research and the publication of data facilitate data comparisons, but also present a challenge due to the differently defined age categories.³⁵ The cremated osteological remains from the Doroslovo site were analysed and published by S. Živanović (2008), while the samples from Batina and Sotin were analysed by P. Rajić Šikanjić.

The traces of children in the previously excavated parts of the contemporary settlement at Batina cannot be analysed until the full publication of the research results. However, among the previously published chance finds, the great majority of which come from the cemetery area,³⁶ objects have been identified that could be associated with children and their activities. Contemporary settlements in Doroslovo³⁷ and Sotin³⁸ had smaller excavated areas, and limited data has been published regarding the infrastructure and finds from such settlements. Larger-scale excavations have been conducted at contemporary settlements in southern Bačka, such as Feudvar,³⁹ and in eastern Syrmia, such as Zemun, Kalakača, and Gradina na Bosutu⁴⁰; their results offer greater opportunities for a more detailed study of traces of childhood in settlements. These settlements belong to the Bosut group, which was spread southeast of the Dalj group, in the southern part of Bačka, most of Srijem, in southern Banat, and northern Serbia.⁴¹ Finds from these settlements will be included only as parallels for specific finds from graves and comparisons of objects related to children in the contexts of finds from cemeteries and the closed contexts from settlements.

CHILDHOOD RESEARCH METHODOLOGY – THEORETICAL FRAMEWORK

The aim of this study is to define childhood at the Batina site by combining biological and cultural data. Both direct and indirect evidence of children's presence will be considered.⁴² Direct evidence includes graves with osteological remains of children, while indirect evidence consists of all other material traces and potential interpretations of contexts where children were present during their lives. The traces of children and childhood at Batina are studied within a child-centred theoretical framework.⁴³

Children influenced most of the everyday family activities and contributed to their households and communities, thereby establishing social relationships with parents, relatives, and the extended family.⁴⁴ Moreover, their contribution to archaeological traces is undeniable, regardless of whether archaeologists can recognize it.⁴⁵ The potential of archaeology lies in identifying material evidence related to children, which also requires an understanding of the adult world and the period under study.⁴⁶ The methodology of the research project *Childhood in protohistory in the southern Carpathian Basin (ARHKIDS)*⁴⁷ begins with examining direct evidence, where objects are associated with human remains – graves.⁴⁸ Indirect evidence can be observed through archaeological data that reflects daily life across time and space – children can be found everywhere in the environment where they lived and died.⁴⁹ The image of childhood in Batina during the Late Bronze Age and at the beginning of the Early Iron Age was reconstructed through an analysis of the relationship between the children's world and the adults' world in the community, based on the investigated children's graves and published chance finds.

³⁴ Живановић 2008.

³⁵ Crawford et al. 2018, 10–12.

³⁶ Metzner-Nebelsick 2002.

³⁷ Trajković 1981, 85.

³⁸ At Sotin, only the peripheral part of the settlement outside the fortified area has been investigated (Ložnjak Dizdar et al. 2009).

³⁹ Hänsel, Medović 1992; Balj 2021.

⁴⁰ Petrović 2010; Medović 1988; Medović, P., Medović, I. 2011.

⁴¹ Medović 1978; Vasić 1987; Medović, P., Medović, I. 2011.

⁴² Halcrow, Tayles 2011; Baxter 2005; Kamp 2001; 2015; Lillehammer 1989; 2000; Sofaer-Dervenski 2000.

⁴³ Lillehammer 1989; Crawford 2009, 55; Kamp 2015, 41.

⁴⁴ Halcrow, Tayles 2008, 200; Klear 2013, 4; Röder 2018, 130–137.

⁴⁵ Klear 2013, 6.

⁴⁶ Lillehammer 1989, 90–91.

⁴⁷ The research project *Childhood in protohistory in the southern Carpathian Basin (ARHKIDS)* was funded by Croatian Science Foundation (RP 2019-04-2520). The research methodology of the project was defined as the multidisciplinary exploration (bioarchaeological, organic remains and stable isotope analyses) of archaeological contexts and material remains which recorded the traces of children and child activities, all in order to provide more complete answers to certain research questions on social age, everyday life, play, and work of children, and their relationship with the environment in which they lived.

⁴⁸ Ložnjak Dizdar et al. 2024.

⁴⁹ Lillehammer 2000, 21.

The paper will also analyse cultural models in the life cycle,⁵⁰ given that all age categories of children are represented in the cemetery at Batina. The analysis of objects directly associated with individuals will try to identify similarities and differences based on the different ages of children, which will be compared with data from Sotin and Doroslovo. Based on ethnographic models, we distinguish six phases in the life cycle. These phases were variable in different communities and represent the social age of children.⁵¹ The first phase is that of the infant, still closely connected to the mother. In the second phase the child is integrated into the community. In the third phase – early childhood – the child is no longer breastfed and is cared for by relatives and community members. In the fourth phase, around the age of five, the child becomes useful and begins to take on more demanding tasks. Gender differentiation starts in this phase. The fifth phase – adolescence – varies across different cultures. It can be shorter or longer, with an emphasis on initiation into the adult world. The sixth phase – adulthood – begins with marriage, followed by childbirth and raising children, by which an individual gains the status of an adult.⁵² The cycles and phases of growing up in Batina are known only fragmentarily through the material traces of children studied from the cemeteries.

BATINA

THE GRAVES

The flat cremation cemetery in Batina has been excavated since 2010, along with three tumuli. To date, there are about 70 excavated graves from the Late Bronze Age and Early Iron Age, of which 25 have been anthropologically analysed, revealing 30 individuals of all age groups, including nine children (Fig. 3). Most of the excavated and analysed graves date from the end of the Late Bronze Age to the Early Iron Age (from the 9th to the 7th century BC). The oldest documented children's grave has been dated to the 12th/11th century BC using the typo-chronological method, which is confirmed by absolute AMS dating (DeA-1203) with measured value of cremated human bone 2894± 28 BP (Fig. 4). This grave belongs to the early horizon of the Dalj group, just like graves 9, 23, 24, 28, 36, 41, 48, 49, etc., in Doroslovo.⁵³

All the graves investigated so far are cremation graves, with a characteristic funerary rite involving the placement of cremated remains in a ceramic urn or

some organic container. Sometimes, the fill of the grave around the urn contained the remains of the pyre – coal, ash, fragments of melted bronze objects, and potsherds, with tiny pieces of cremated bones. The size of the grave pit was adapted to the planned burial scenario and the choice of grave goods. Children were buried in single graves just like the adult members of the community. In three cases, children's remains were found in double graves: two with adults (36 and 52) and one with another child (90). The double child grave 90 will be used as an example to present in more detail the funerary rites applied in Batina.

The double grave 90 (Fig. 5) in Batina was found in trench 15 and is partially cut through by younger burials on the eastern and southern sides. The grave pit was rectangular, with rounded corners and vertical walls. The fill of the grave was dark brown in colour. In the central part of the grave pit there was a pot (Fig. 5, 1 SF 671) with cremated bones and burnt debris, likely from the pyre. To the north of the pot was a dish (Fig. 5, 2 SF 670) with fish bones, while on the western side were a jug (Fig. 5, 3 SF 668) and a cup (Fig. 5, 4 SF 669). All of these vessels were placed in a circular layer of burnt debris, likely from the pyre, including cremated bones. In the north-western corner of the grave pit, unburned animal bones (pig and sheep/goat) were found. This urn contained the cremated remains of a child aged 0–6 years.

In the north-eastern corner of the burial pit, a pot (Fig. 5, 5 SF 673) was found containing cremated bones along with cremation debris, likely originating from the pyre. The pot was covered with an inverted bowl (Fig. 5, 6 SF 672). East of the pot was a bowl with a pedestal (Fig. 5, 7 SF 676) containing animal bones (phalanx bones of cattle, as well as the astragali of a pig and a deer) and another pot (Fig. 5, 8 SF 675). A cup (Fig. 5, 9 SF 673) was discovered south of the pot. All the vessels were placed within a layer of cremation debris, likely from the pyre, arranged in a circular shape and including cremated bones. This urn included the cremated remains of a child aged 6–12 years.

The composition of grave goods, the selection of the urn based on the size of the body, and the vessels chosen on the basis of pre-planned meals and offered

⁵⁰ Grove, Lancy 2018.

⁵¹ Grove, Lancy 2018, 98.

⁵² Grove, Lancy 2018, 98.

⁵³ Трајковић 2008, 189, 201 *passim*.

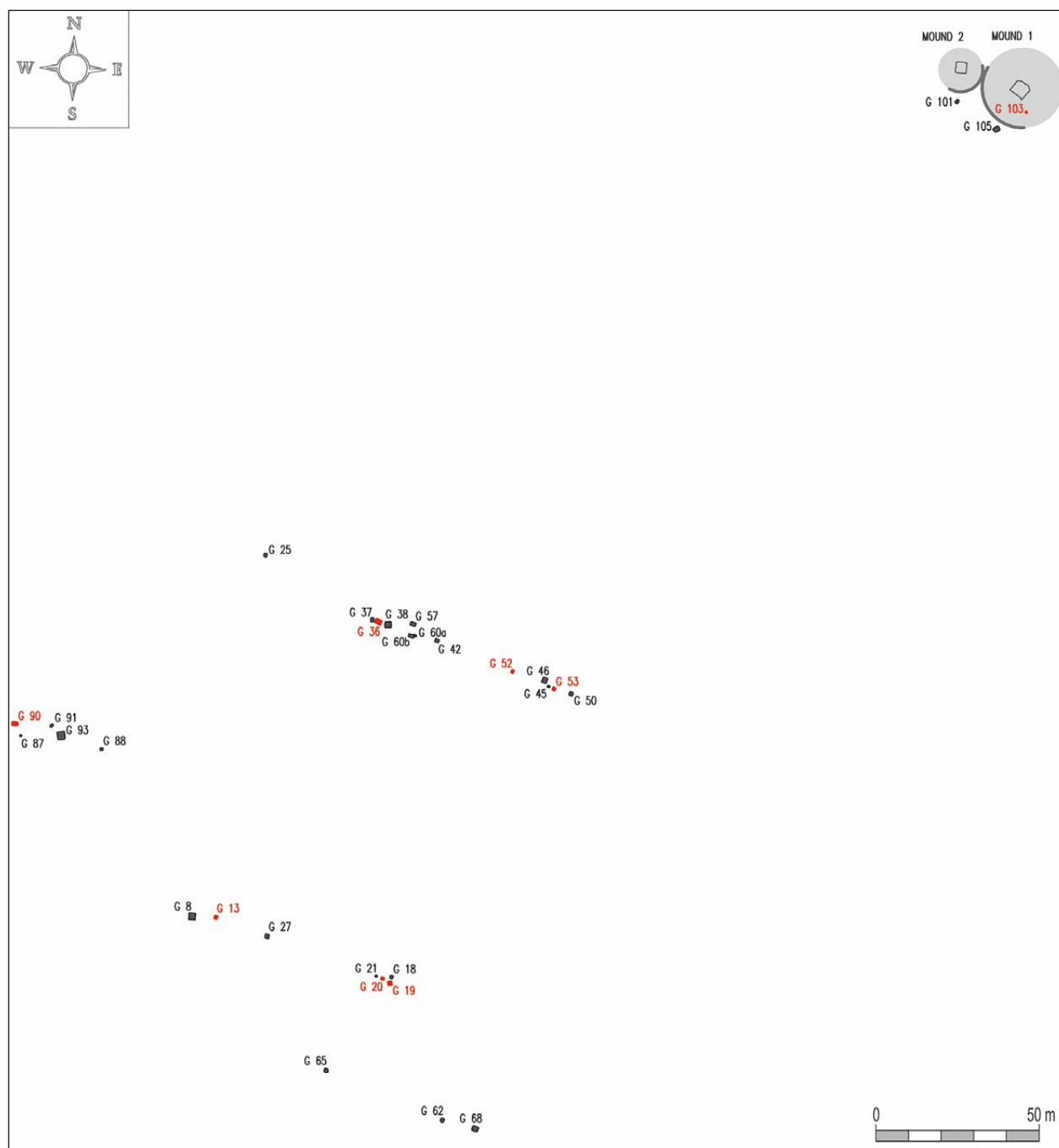
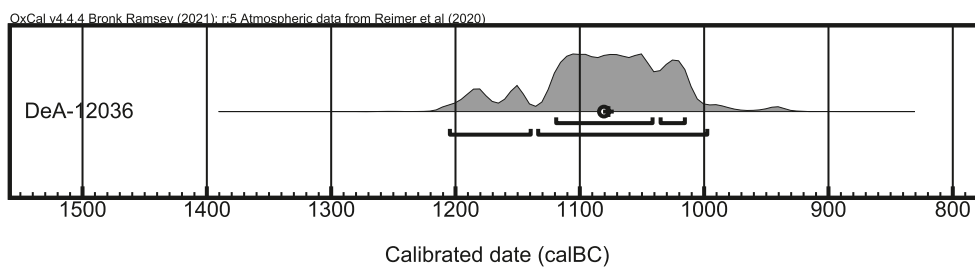


Fig. 3. Ground plan of a part of the excavated cemetery in Batina (Arheoplan Ltd for Institute of Archaeology)

Сл. 3. План дела исцраженої гробља у Баїніни (Марин Мађерић за Институтуи за археологију)

Fig. 4. Batina,
grave 103,
radiocarbon date

Сл. 4. Баїнина,
гроб 103,
радиокарбонски
датиум



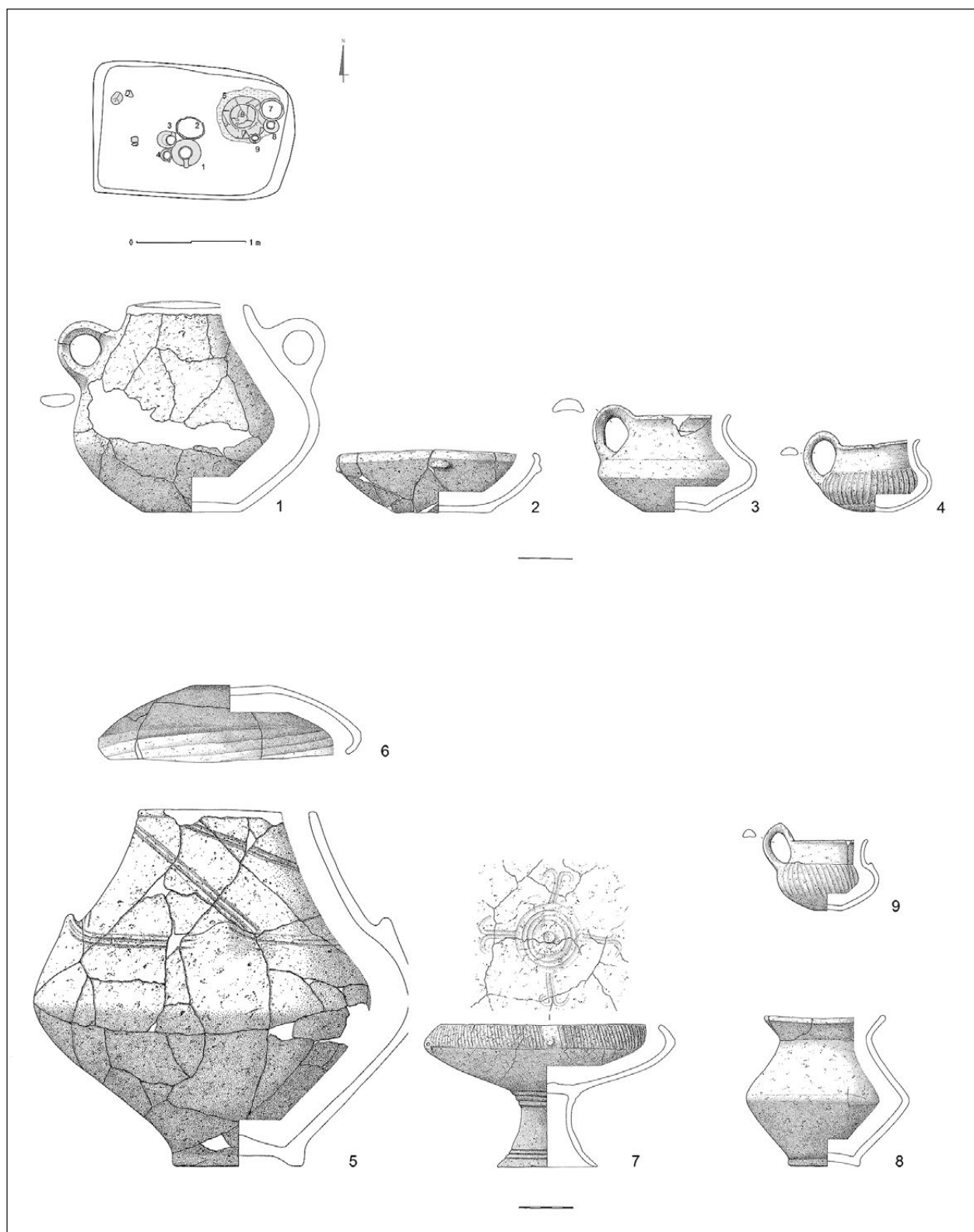


Fig. 5. Grave 90 (drawing prepared by Arheoplan Ltd; drawing of finds by Matilda Marijanović Lešić for Institute of Archaeology)

Сл. 5. Гроб 90 (цртеж гроба приредио Археоплан д. о. о.; цртежи налаза Матилда Маријановић Лешић за Институт за археологију)

GRAVE	TYPE OF GRAVE	AGE	PATHOLOGICAL CHANGES
13		0–5	
19		12–20	
20		child	
36	double (adult)	child	
52	double (adult)	0–6	
53		0–6	endocranial lesions
90a	double (child)	0–6	
90b	double (child)	6–12	
103	child	0–6	

Fig. 6. Table with the anthropological analysis data

Сл. 6. Таблица с подацима антрополошке анализе

for the final feast, indicate that the burial of the deceased in grave 90 at Batina followed a carefully devised scenario. This concept can also be observed in other excavated graves at Batina, where the size of the burial pit most often corresponds to the number of accompanying vessels, which does not depend on the age or sex of the deceased but rather on some other selection criterion.

Anthropological analysis

Children's graves were identified through the results of anthropological analyses. The children were grouped into three age categories: up to 5 years, 6 to 11 years, and 12 to 20 years (Fig. 6). The highest mortality was observed in the youngest age group, up to 5 years, which corresponds to patterns seen in other communities.

Based on the osteological analysis, age at death and pathological changes could be identified. In the child from grave 53, endocranial lesions were observed. Endocranial lesions are changes that appear on the inner surface of the cranial bones.⁵⁴ These lesions result from inflammation and haemorrhage caused by various conditions such as meningitis, tuberculosis, syphilis, bone tumours, metabolic diseases, and traumatic injuries.⁵⁵

In younger children, particularly those between 3 and 7 years of age, the formation of new bone is not always a pathological condition and can be considered a normal occurrence. During this period, rapid brain and endocranial development can lead to the formation of a new bone layer, which may not always be easily distinguished from pathological conditions.⁵⁶

Archaeological artifacts

Archaeological artifacts from Batina that can be associated with children are diverse: ceramic vessels, jewellery, costume items, tools, and toys.

Ceramic vessels

From earlier research, the most numerous finds are ceramic vessels from destroyed graves, accidentally discovered at the end of the 19th and the beginning of the 20th century, and those from settlement areas. More recent research since 2010 has confirmed that ceramic vessels are the most common grave goods. These were used as urns (Fig. 7), urn lids, and containers for food and drink in the funerary rite (Fig. 8). Pots (G 53, 90, 36), a bowl (G 20, 52), and a jug (G 103) were used as urns. Bowls (G 90) or a cup (G 103) were used as lids.

Other vessels appearing in various types and combinations as grave goods – containers holding food and drink – are bowls, kantharoi, cups, pots, jugs, an amphora, a bowl with a foot, and a double vessel.

No regularity was observed regarding the different ages of children that could be linked to the choice of type and number of vessels, or the amount of content placed in the grave. No regularity was recorded at the cemeteries in Sotin and Doroslovo either. However, a regularity was observed in relation to contemporary graves of adults at all three cemeteries. Specifically, the vessels containing food and drink in graves 13, 20,

⁵⁴ Lewis 2007.

⁵⁵ Lewis 2004; Rohnbogner, Lewis 2017.

⁵⁶ Lewis 2004; Rohnbogner, Lewis 2017.



Fig. 7. Urn types (photo by Bruno Jobst for Institute of Archaeology)

Сл. 7. Типови урни (фото: Бруно Јобст за Институт за археологију)

and 90 in Batina had a smaller volume than those in contemporary graves of adults, suggesting that these vessels may have been used by the children during their lifetime. A similar pattern was observed in graves 3, 4, 8, 50, and 122 in Sotin, as well as in graves 50, 51, 53, 82, 128, 133, and 139 in Doroslovo.⁵⁷

Vessel content

The vessels used in the funerary ritual could have been linked to the community that buried the deceased or to the deceased themselves, as concluded from the size of the individual vessels placed in children's graves. The size of the vessels was adapted to the age of the deceased. Small vessels may have served as personal eating utensils, but also as containers whose contents were a meal for the deceased, quantitatively determined according to the age of the deceased. Organic residue (lipid) analysis (ORA) is often used to obtain data on vessel use, diet, and various social and economic aspects of the archaeological community. It is based on the fact that lipids, due to their hydrophobicity and chemical structure, easily

penetrate the walls of ceramic vessels and survive there for long periods; the recovered molecules – biomarkers – can be used to identify the contents of the vessels (e.g., animal fat, dairy fat, fish, plants or beeswax). Preliminary analyses of the organic residue from a kantharos in grave 78 at Sotin have shown traces of millet.⁵⁸

This paper analyses vessels from two graves in Batina – two vessels from grave 20 and nine from grave 90 – to determine whether they were used in a way that would leave organic residues (during the funerary ritual/feast or as container for grave goods in the form of food/drink, or if they were possibly used as kitchenware in the settlement and later placed in the grave), or if their only function was to serve as grave goods placed in the grave new, without contents, or potentially with contents that would not leave traces.

⁵⁷ Трајковић 2008, 225, grave 50, 5, 227, grave 51, 7, 230, grave 53, 4–5, *passim*.

⁵⁸ Metzner-Nebelsick et al. 2022.



Fig. 8. Types of vessels used in funerary rites (photo by Bruno Jobst for Institute of Archaeology)

Сл. 8. Типови посуда коришћених у погребним обичајима (фото: Бруно Јобст за Институт за археологију)

All the vessels from grave 90 have been analysed: BAT1 (SF-671) pot – urn (Fig. 5, 1), BAT2 (SF-670) bowl (Fig. 5, 2), BAT 3 (SF-668) jug (Fig. 5, 3), BAT 4 (SF-669) cup (Fig. 5, 4), BAT 5 (SF-672) bowl, urn lid (Fig. 5, 6), BAT 6 (SF-675) pot (Fig. 5, 8), BAT 7 (SF-676) bowl with pedestal (Fig. 5, 7), BAT 8 (SF-674) cup (Fig. 5, 9), and BAT 9 (SF-673), pot – urn (Fig. 5, 5). From grave 20: BAT 10 pot (SF 170) and BAT 11 vessel (SF-170a).

For each vessel, a sample was taken from the body beneath the rim. About 1–2 grams of powder were ground (the surface layer was removed to minimize contamination), and the analysis was conducted following the standard protocol for this type of research⁵⁹ at the University of Bristol.

The samples were first analysed using gas chromatography (GC-FID) to determine the presence and quantity of lipids, and then gas chromatography-mass spectrometry (GC-MS) was used to identify the compounds present based on their molecular masses. Selected samples were analysed using gas chromatography-combustion-isotope ratio mass spectrometry (GC-C-IRMS) to obtain stable $\delta^{13}\text{C}$ isotope values from palmitic and stearic acids, which are used to differentiate between ruminant fats, non-ruminant fats, and dairy fats.⁶⁰

Traces of lipids (5–34 $\mu\text{g/g}$) were found on all nine samples from grave 90, but only one sample (BAT09) allowed for the ^{13}C isotope analysis, while three samples (BAT03, 05, and 06) contained insufficient lipids for interpretation.

The remaining five samples primarily contained fatty acids, with palmitic acid ($\text{C}_{16:0}$) and stearic acid ($\text{C}_{18:0}$) being the most predominant, suggesting a possible origin from animal fats. The dominance of palmitic ($\text{C}_{16:0}$) and stearic ($\text{C}_{18:0}$) acids is typical of animal fats, and the very low concentration of $\text{C}_{18:1}$ acid, also observed in our samples, confirms that these are indeed archaeological fats due to their tendency to oxidize.⁶¹ All of the mentioned samples contained modern contaminants, so the archaeological organic residue cannot be interpreted in more detail. It can, however, be tentatively assumed that these vessels most likely contained animal fats (which cannot be determined with greater precision) at some point during their use.

The biconical pot with a conical neck, BAT9 (SF-673) (Fig. 5,5), contains a lipid concentration of 23 $\mu\text{g/g}$, with fatty acids $\text{C}_{16:0}$, $\text{C}_{18:0}$, and $\text{C}_{22:0}$ dominating, followed by the unsaturated $\text{C}_{18:1}$, and very small amounts of alcohols C_{16} and C_{18} , as well as odd-chain alkanes

C_{23} – C_{27} . This corresponds to animal fats.⁶² The obtained isotope value of $\Delta^{13}\text{C}$ 0.3 ‰ ($\delta^{13}\text{C}$ ($\text{C}_{16:0}$) – 30.5 ‰; $\delta^{13}\text{C}$ ($\text{C}_{18:0}$) – 30.2 ‰) falls between values for ruminants (cattle, sheep and goats) and non-ruminant (pig) adipose fats,⁶³ and its position outside confidence ellipses and along the mixing curve (Fig. 9) indicates that it is most likely a mixture of ruminant and non-ruminant fats. The vessel in the grave served as an urn, and it was most likely used for food preparation before it was given its new function.

In grave 20, significant lipid residues were found only in the larger pot (BAT10). It contained a high concentration of lipids (1354 $\mu\text{g/g}$), saturated even-chain fatty acids from $\text{C}_{16:0}$ to $\text{C}_{28:0}$, the saturated fatty acid $\text{C}_{18:1}$, long-chain even-numbered alcohols from C_{16}oh to C_{32}oh , and alkanes C_{23} , C_{25} , C_{27} , C_{29} , and C_{31} (Fig. 10). This distribution of compounds indicates the possible presence of beeswax, most likely in a mixture with animal fat. The high concentration of palmitic acid (significantly higher than stearic acid), the presence of long-chain fatty acids dominated by the fatty acid $\text{C}_{24:0}$, and the even-numbered alcohols and odd-numbered alkanes, which are by-products of wax ester degradation in archaeological wax samples, point to the presence of wax – either beeswax if alkane C_{27} dominates⁶⁴ or wax from plant leaves or stems if alkane C_{29} dominates.⁶⁵ In the case of pot BAT10 from grave 20, there was a slightly higher concentration of alkane C_{27} , which supports the interpretation that it contained beeswax. Unfortunately, it was not possible to conduct an additional analysis (solvent extraction), and the presence of wax esters was not directly confirmed. Nevertheless, we can conclude that this was most likely

⁵⁹ 20 μg of internal standard for quantification (n-tetratriacontane) was added to each sample and lipids were then extracted from ceramic powder using direct methanolic acid extraction ($\text{H}_2\text{SO}_4/\text{MeOH}$, 4 % v/v, 5 mL, 70 °C, 1 h). They were then centrifuged, and total lipid extracts (TLE) were obtained by extracting with n-hexane (2x3 ml and 2x2 ml) (Correa-Ascencio and Evershed 2014). Aliquots of TLE were dried under a nitrogen stream and derivatized with 20 μl BSTFA (N,O-bis (trimethylsilyl) trifluoroacetamide), heated at 70° C for one hour, dried, and redissolved in n-hexane before analysis.

⁶⁰ Evershed et al. 2002.

⁶¹ e.g., Evershed 1993; 2008; Evershed et al. 1999; 2002.

⁶² Evershed et al. 1999; Evershed 1993; 2008.

⁶³ Evershed 2008; Evershed et al. 2002.

⁶⁴ Evershed et al. 1991; Regert et al. 2001; Roffet-Salque et al. 2015.

⁶⁵ Charters, Evershed 1997; Evershed et al. 1991.

Fig. 9. The graph shows: a) $\delta^{13}\text{C}$ values for fatty acids $\text{C}_{16:0}$ and $\text{C}_{18:0}$ from sample BAT09 with confidence ellipses ($p = 0.684$) for ruminant and non-ruminant adipose fats and dairy fats from animals fed on a C_3 plant diet in Britain⁶⁶ (Copley et al. 2003), b) $\Delta^{13}\text{C}$ ($\delta^{13}\text{C}_{18:0} - \delta^{13}\text{C}_{16:0}$) values for the same sample. The intervals represent the mean values ± 1 s.d. for $\Delta^{13}\text{C}$ values of reference modern fats from the global database⁶⁷ (Dunne et al. 2012; Dudd, Evershed 1998; Gregg et al. 2009; Outram et al. 2009; Spangenberg et al. 2006)

Сл. 9. Граф приказује: а) $\delta^{13}\text{C}$ вредности за масне киселине $\text{C}_{16:0}$ и $\text{C}_{18:0}$ из узорка BAT09 с елипсима поузданости ($P = 0.684$) за адипозне масије преживача, непреживача и млечне масије животиња храњених C_3 биљкама из Британије (Copley et al. 2003), б) $\Delta^{13}\text{C}$ ($\delta^{13}\text{C}_{18:0} - \delta^{13}\text{C}_{16:0}$) вредности за исти узорак. Интервали представљају средњу вредност ± 1 с.г. за $\Delta^{13}\text{C}$ вредности за референцине модерне масије из глобалне базе података (Dunne et al. 2012; Dudd, Evershed 1998; Gregg et al. 2009; Outram et al. 2009, Spangenberg et al. 2006)

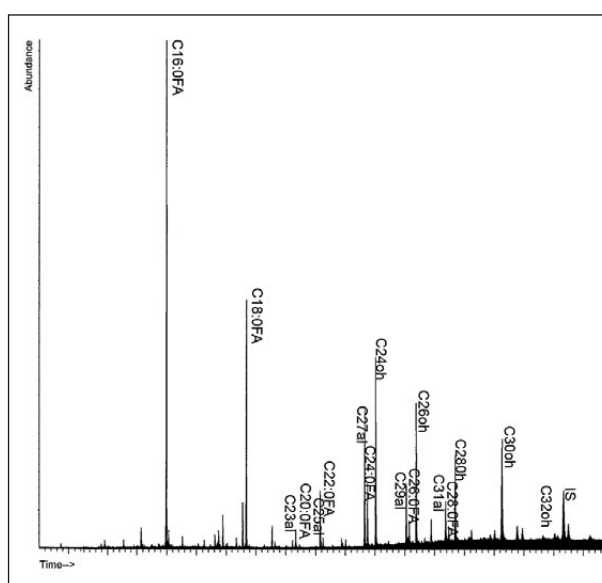
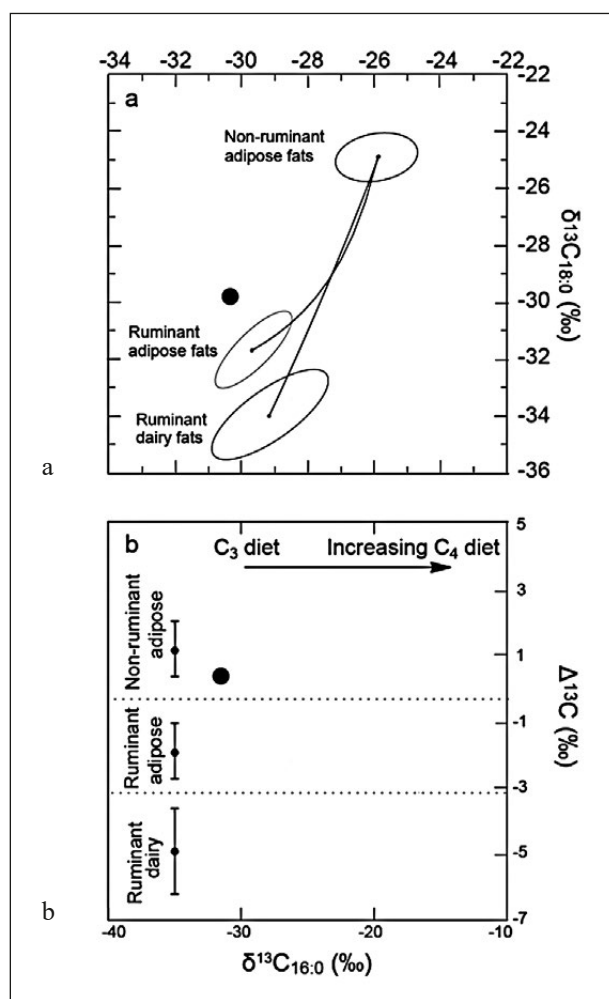


Fig. 10. Partial chromatogram of sample BAT10 ($\text{C}_x\text{:}y = n$ -number of carbon atoms, y -number of saturations, FA = fatty acid, al = n -alkane, oh = n -alcohol, IS = internal standard – tetratriacontane)

Сл. 10. Делимични хроматограм узорка BAT10 (C_n = број атома угљеника, FA = масна киселина, al = n -алкан, oh = n -алкохол, IS = унутрашњи стандард – тетратриакоктан)

a mixture of beeswax and animal fat. Beeswax was often used as a coating for vessels, but it can also serve as an indirect indicator of the presence of honey (as an ingredient in some beverage, seasoning, etc.).⁶⁸ The vessel was likely used for food preparation or consumption in the settlement before being placed in the grave, possibly during the funerary rite as well. Due to the very high lipid concentration, it is unlikely that the organic residue analysis merely detected something

that was placed in the vessel as a grave good. The other analysed vessel from grave 20 contained an insignificant amount of lipids that cannot be interpreted.

⁶⁶ Copley et al. 2003.

⁶⁷ Dunne et al. 2012; Dudd, Evershed 1998; Gregg et al. 2009; Outram et al. 2009; Spangenberg et al. 2006.

⁶⁸ e.g., Kimpe et al. 2002; Regert et al. 2001.

Most of the vessels from both graves contained very small amounts of lipids and/or could not be satisfactorily interpreted due to modern contamination. However, this most likely does not mean that these vessels were placed in the grave as unused as containers. Lipids are best preserved in vessels when something is cooked in them, whereas other activities leave weak traces.⁶⁹ Some vessels, both in the grave and during the lifetime of the deceased, may have been used as vessels for contents that would not leave strong traces.

Another indicator that may point to children's diet is the presence of animal remains in graves, which are associated with meat-based meals. Eggshells were discovered in two graves where children were buried (grave 13 in Batina and grave 164 in Sotin). In the double grave 90, fish bones were found in a bowl near the urn of the younger child, along with cattle phalanges and astragali of pigs and deer in urn SF 673 and in a bowl with a foot in the dining set belonging to the older child.⁷⁰ In children's graves (G 83, G 140) from Doroslovo, sheep/goat and pig bones were discovered.⁷¹ Based on the preserved bones, it can be concluded which part of the meat was placed in the grave as a meal, while some animal parts may have had other functions as well.⁷² In grave 83 in Doroslovo, it was likely the thigh, and in grave 140, likely the feet of pigs and sheep/goats.

Jewellery

Costume items are very rarely preserved in the cremation graves of the Dalj group. Most often, costume items as burial garments were exposed to intense fire and severely damaged, making it difficult to discuss the function of individual finds.

Three iron torques were found in child grave 13 from Batina, and a similar torque was in child grave 103 in Doroslovo.⁷³ Torques identical to the one from Batina were also found in adult graves (111, 113, and 129) in Doroslovo.⁷⁴ Judging by the grave goods in grave 111, it most likely belonged to a man. Such finds in children's graves may indicate the status of the child, possibly a boy, within the community, especially as the child was younger than 6 years old.

Ring-shaped hair ornaments are the most common costume finds in the cremation graves of the Dalj group.⁷⁵ In Batina, such ornaments are rare and appear in two graves, 36 and 19. Grave 36 is a double grave containing an adult whose sex and age could not be determined and a child aged 6 to 12 years.⁷⁶ Since two

individuals were present in the grave, it was not possible to determine to whom the ornament belonged. In grave 19, the hair ring was found with an adolescent aged 12–20 years. In Doroslovo, hair ornaments appear in double grave 50, containing an adult and a child aged 0–7 years,⁷⁷ and in grave 139, containing a child aged 7–14 years.⁷⁸ In Sotin, the rings appear in the graves of older children and early adolescents, aged 6–15 years (graves 51, 86), and could have signalled age and/or social status within the community.

A small amber bead was found in double grave 52 in Batina, containing a younger adult whose sex could not be definitively determined and a child younger than 6 years. Amber finds are very rare in Late Bronze Age and Early Iron Age graves in the southern Carpathian Basin,⁷⁹ possibly due to the cremation of the bodies. Amber beads that appear in Iron Age graves in Italy, more frequently in the graves of women and children and less often in those of men, are attributed with apotropaic significance.⁸⁰

Glass beads were found in the graves of adolescents aged 12–20 years (grave 19 in Batina (Fig. 11), and grave 128 in Doroslovo); since they were not exposed to fire, they could represent either the jewellery of the deceased or a farewell gift from the community. Those from Batina are six blue beads, placed in the pit of grave 19. Those from Doroslovo are one dark and two yellow beads, found together with five whorls with diameters ranging from 1.7 to 3.2 cm, as well as two iron hoops, bronze beads, three bronze coils, and an iron knife.⁸¹ The structure of the tools and costume items in this grave is similar to that of grave 19 from Batina. These two rare adolescent graves indicate that the deceased of this age group were similarly equipped

⁶⁹ Charters et al. 1993.

⁷⁰ Barbir 2022, 263.

⁷¹ Блажић 2008, 358–359, 371, 374, Table 1.

⁷² Barbir 2022, 266–267.

⁷³ Трајковић 2008, 112, 260, grave 103, 4.

⁷⁴ Трајковић 2008, 118, 266, 268, grave 111, 8; grave 113, 8; grave 129, 13.

⁷⁵ Ložnjak Dizdar, Rajić Šikanjić 2016a, 119, fig. 6, 4.

⁷⁶ Vojčić et al. 2018, 167–168, T. 1, 4.

⁷⁷ Трајковић 2008, 73, 226, grave 50, 11–12.

⁷⁸ Трајковић 2008, 154–155, 303, grave 139, 7–8.

⁷⁹ Cwalinski, Czebreszuk 2020, 59–60.

⁸⁰ Hladikova 2018, 70.

⁸¹ Трајковић 2008, 136–137, 285–286.



Fig. 11. Glass beads from Batina grave 19 (photo by Bruno Jobst for Institute of Archaeology)

Сл. 11. Стаклене перле из гроба 19 из Батине (фото: Бруно Јобст за Институт за археологију)

in terms of costume and jewellery, but also tools. Blue beads are a frequent find in Late Bronze Age and Early Iron Age graves in the Carpathian Basin and beyond.⁸² Chemical analyses of such beads have shown that the production centre was located in northern Italy, in Frattesina.⁸³

Tools

Children contributed to the daily life of the community through their work from an early age. Evidence for this can be found in graves containing tools for textile production – whorls, needles, and iron knives – which must have been universal tools that younger members of the community could use to help with food preparation, textile production, plant gathering, and other daily tasks. In Batina (grave 19: knife and two whorls)⁸⁴ and Doroslovo (grave 128: knife and five whorls),⁸⁵ such grave goods were found in the aforementioned graves of adolescents aged 12–20 years, when this age group likely played a significant role in the household of the community they lived and worked in, and could have been considered adult members of the society.⁸⁶ A whorl was found in the double grave 36 (adult and child), so it may more likely be attributed to the adult buried in the grave.⁸⁷ Whorls as grave goods were already found in graves of children aged 7–14 years in Doroslovo, such as in grave 139.⁸⁸

Toys

Toys are a rare find in the graves of the Dalj group. Grave 20 at Batina, in which a child of undetermined age was buried, included ceramic beads, possibly marbles (Fig. 12); grave 50 in Doroslovo (child, 0–7 years) contained three stone pebbles.⁸⁹ Several children's graves contained stone tools, such as grave 122 (child, 0–7 years) in Doroslovo, which also included two astragaloi with holes in the middle,⁹⁰ similar to those found in the double child grave 90 (children, 0–6, 6–12 years) in Batina. The astragaloi found in grave 90 in Batina could have been toys, but also amulets, or maybe they served another function.⁹¹

⁸² Plestenjak 2010, 41, 103, cat. nos. 116–117; Starè 1975, 15, T. 2, 5; Patek 1961, 79, T. 5, 3; Križ et al. 2009, 70.

⁸³ Towle et al. 2001; Venclová et al. 2011, 578–579, Fig. 1.

⁸⁴ Dizdar et al. 2021, 129.

⁸⁵ Трајковић 2008, 136–137.

⁸⁶ Hoffman 2014.

⁸⁷ Bojčić et al. 2018, 166–167, T. 1, 1; Rajić Šikanjić, Ložnjak Dizdar 2022, fig. 1.

⁸⁸ Трајковић 2008, 154–155, 303–304.

⁸⁹ Трајковић 2008, 72–74.

⁹⁰ Трајковић 2008, 128–129, 277, grave 122, 4–5.

⁹¹ Rustoui 2016; Rostoui, Gal 2018.



Fig. 12. Ceramic beads / marbles from grave 20 (photo by Bruno Jobst for Institute of Archaeology)

Сл. 12. Керамичке кулице – њикуле из гроба 20 (фото: Бруно Јобст за Институт за археологију)

Rituals

During the Late Bronze Age and Early Iron Age, the bodies of deceased children were cremated, just like other members of the community. This tradition has its roots in the Bronze Age and is visible in the continuity of burial sites, such as in Batina and Doroslovo, from the 11th century BC, when the oldest graves in these cemeteries were dated. This is supported by the find of one of the oldest graves at Batina (G 103), whose radiocarbon dates of the cremated bones range between the 12th and 10th centuries BC (Fig. 4).

Funerary customs changed over the centuries. In the 11th century BC, in the southern Carpathian Basin, the cremated remains of the deceased were placed in an urn, chosen based on the size of the body, or the amount of cremated bone collected from the pyre.⁹² The urn was most often covered with an overturned bowl. Very rarely, other vessels were placed in the grave, usually drink recipients, as seen in grave 53 from Doroslovo.⁹³ The urns containing the cremated remains of children were most often amphorae or jugs of very small volumes.⁹⁴ Examples include grave 103 from Batina (Fig. 13) and graves 53, 71 and 102 from Doroslovo.⁹⁵ In the 9th century BC, there was a change in the number of vessels placed in graves, which also varied independently of sex and age, but perhaps depended on the social and economic status of the deceased and the community that buried them. The urns

increasingly became uniform for all individuals in the community,⁹⁶ and graves contained not only drink vessels, but also other grave goods, such as food in numerous bowls and various liquids in large pots.⁹⁷

The children's graves at Batina rarely lack vessels (graves 52 and 36); in most cases, there are several vessels, sometimes even a complete set (e.g., graves 19, 20 and 90). In contrast, graves at Sotin (for example, grave 50) and Doroslovo, typically contained one or two vessels, and only occasionally a larger number. This is most often observed in double graves of an adult, usually a woman, and a child.⁹⁸

In double graves, it was only in rare cases that the same pyre was used, followed by the same urn, as in grave 36 at Batina⁹⁹ or grave 1 at Sotin.¹⁰⁰ Most often,

⁹² Ložnjak Dizdar, Rajić Šikanjić 2016b.

⁹³ Трајковић 2008, 77–78, 230, grave 53, 4–5.

⁹⁴ Ložnjak Dizdar, Rajić Šikanjić 2016b; Ložnjak Dizdar et al. 2018.

⁹⁵ Трајковић 2008, 77, 90, 111.

⁹⁶ Ložnjak Dizdar, Rajić Šikanjić 2016a, 111–115, fig. 3.

⁹⁷ Nebelsick 1997; 2016; Metzner-Nebelsick 2002, 179–181, fig. 79–80.

⁹⁸ Ložnjak Dizdar 2019; Трајковић 2008, 225–226, 390.

⁹⁹ Bojčić et al. 2018, 166.

¹⁰⁰ Ložnjak Dizdar 2019, 89.

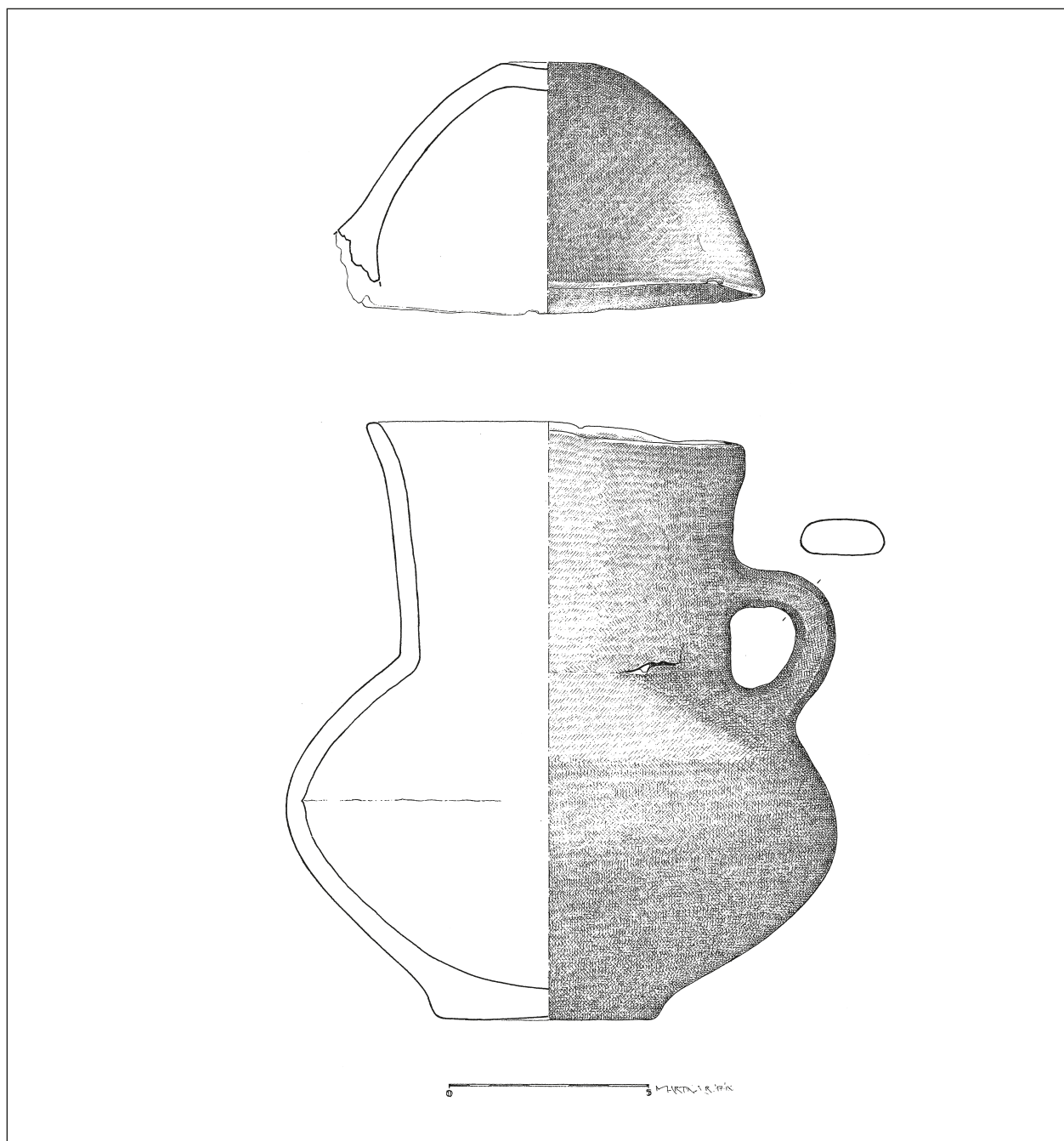


Fig. 13. Urn and lid from grave 103 at Batina (drawing by Martina Rončević)

Сл. 13. Урна и поклопац из гроба 103 из Бајине (цртеж Мартина Рончевић)

separate pyres and urns were used, which were then placed in the same grave, such as in grave 90 (Fig. 5) at Batina and grave 86 at Sotin, as shown by the results of anthropological analyses. Based on the excavated and analysed child graves at Batina, it can be concluded that the cremated bones were more often placed in an urn (6), and less often in an organic recip-

ient (4) (such as fabric, leather, or a basket). At the Sotin cemetery, cremated bones were almost exclusively placed in urns, as was the case in Doroslovo.¹⁰¹

¹⁰¹ Трајковић 2008, 72, *passim*.

CHANCE FINDS

The chance finds include: a large number of small bowls and pots that could have served as toys;¹⁰² small lids¹⁰³ and a small jug with a tubular spout.¹⁰⁴ Miniature vessels have been found in settlements of the Bosut group: Kalakača,¹⁰⁵ Ilok,¹⁰⁶ Feudvar,¹⁰⁷ and Gradina na Bosutu.¹⁰⁸ Jugs with tubular spouts were found in grave 133 at Doroslovo, where a child aged 7 to 14 years was buried,¹⁰⁹ and in grave 25, which was not anthropologically analysed.¹¹⁰ Organic residue analysis should be conducted on these vessels to further determine their contents and function. Analyses of small vessels with tubular spouts from the same period in Austria and Germany revealed that they contained milk from ruminants and may have been used for infant feeding.¹¹¹ Similar bottles were found as chance finds at Sotin.¹¹² The finds also included bird-shaped vessels¹¹³ and a bird-shaped rattle.¹¹⁴ Two bird-shaped vessels were found in graves 123 and 143 at Doroslovo, but only the age of the individual in grave 123 was determined, and it was an older person.¹¹⁵ Unusual artefacts such as a spinning top and a teether object were found at Batina.¹¹⁶ A very similar teether object was discovered in grave 36 at Batina, where a child and an adult were buried.¹¹⁷ This context, and the size of the object, suggest that the object may be associated with the child. A counter-argument is the sharpness of the teeth on the object, as well as different interpretations that point to another purpose – a tool related to pottery decoration or textile production. Also, the object could have had a votive meaning.¹¹⁸ Similar objects from Romania are interpreted as tools for magic or as items with apotropaic significance for the person to whom they belonged.¹¹⁹

DISCUSSION

Children are an important part of every society, so they have to be included in the analysis of a community in order to fully understand it. We distinguish between biological age, determined from osteological remains, and social age, defined by the costume and rituals of the community. Prehistoric populations are often characterized by high child mortality, especially among those under 5 years old. At Batina, the highest child mortality occurred in children under the age of 5 – the most vulnerable group. A similar trend is observed at the Sotin and Doroslovo sites. Pathological changes have been recorded only on the cremated remains of a child in grave 53 at Batina. The youngest children are

the most vulnerable members of society for several reasons. One is the risk associated with birth and complications that can arise during this time. Another issue is their underdeveloped immune system, which makes them more susceptible to infections, as well as the transition to solid food, when children can also be exposed to various pathogens. Children older than 6 years are part of the community that survived this initial dangerous period related to birth and the transition to solid food and gradually become independent and full members of their community.

Children up to the age of 5 belong to the first three developmental stages (after Grove and Lancy). Unfortunately, at Batina, it was not possible to determine more precisely the age of children within the group under 6 years old. Therefore, these first three stages of the cultural age model cannot yet be analysed in detail. Only one child could be identified as belonging to the first developmental stage, a baby aged 0–6 months from Grave 1 at Sotin.¹²⁰ The fourth (from 6 years) and the fifth (adolescent) phases of development are more easily recognized archaeologically, but due to lower mortality in this age group, there are fewer graves. The transition from adolescence to adulthood occurred within the biological age range of 12–20 years, but the current state of research and the cremation burial practices do not provide enough data to determine this age more precisely. The analysed sample of children's graves from Batina is most numerous for the period of the 9th and 8th centuries BC (or phases II

¹⁰² Metzner-Nebelsick 2002, 595, T. 5, 7–9; T. 12, 10–11, *passim*.

¹⁰³ Metzner-Nebelsick 2002, 595, T. 12, 6, 9, *passim*.

¹⁰⁴ Metzner-Nebelsick 2002, 595, T. 35, 5.

¹⁰⁵ Medović 1988, 417–419.

¹⁰⁶ Ložnjak Dizdar et al. 2024.

¹⁰⁷ Balj 2021, 124–133.

¹⁰⁸ Medović, Medović 2011, 293.

¹⁰⁹ Трајковић 2008, 144–145, 293.

¹¹⁰ Трајковић 2008, 202.

¹¹¹ Rebay-Salisbury et al. 2021.

¹¹² Ložnjak Dizdar, Drnić forthcoming.

¹¹³ Metzner-Nebelsick 2002, 595, T. 17, 4; T. 26, 9.

¹¹⁴ Metzner-Nebelsick 2002, 595, T. 14, 15.

¹¹⁵ Трајковић 2008, 278, grave 123, 7 309, grave 143, 2.

¹¹⁶ Metzner-Nebelsick 2002, 595, T. 17, 5–6.

¹¹⁷ Bojčić et al. 2018, 163, 166, T. 1, 8.

¹¹⁸ Metzner-Nebelsick 1997, 578–579, map 3.

¹¹⁹ Jugănar 2005, Fig. 10; Rustoiu 2016, 56; Rustoiu, Gal 2018.

¹²⁰ Ložnjak Dizdar, Rajić Šikanjić 2020, 112.

Dating/age	0–6	6–12	12–20
11 th c. BC	103		
9 th –8 th c. BC	13,52,53,90	20, 90 (d)	19
end of 8 th –7 th c. BC	36 (d)		

Fig. 14. Table of children's graves from Batina with dating

Сл. 14. Табела децјих гробова из Бајине са датирањем

and IIIa according to C. Metzner Nebelsick,¹²¹ therefore, it is not possible to draw diachronic conclusions about similarities and differences in childhood over a longer period (Fig. 14).

Objects associated with children at Batina, either through context, size, or function, are represented in graves and chance finds. In graves, these include ceramic beads, tools, and jewellery, as well as smaller vessels. Jewellery, such as hair ornaments, appears in graves of children aged 6–11 years, and is more common in individuals aged 12–20 years, although these graves are the rarest. Tools, such as flint tools and whorls, are found in graves of individuals aged 6–11 years. In adolescent graves, tools such as iron knives and numerous whorls are similar to those in adult graves. Children's graves at Sotin and Doroslovo contained pebbles, and perforated animal astragali, and often whorls, showing a slightly different selection of grave goods. This difference could also be due to the varying number of excavated and analysed graves so far. Therefore, the following conclusions are preliminary. It is possible that children in the communities of Sotin and Doroslovo were required to participate in various daily activities at an earlier age, which may explain the larger number of tools found in their graves there compared to those at Batina.

In the burial practices at Batina, it is noticeable that organic material recipients are used more frequently than ceramic vessels serving as urns, in contrast to Sotin and Doroslovo. The method of placing grave goods also slightly differs from nearby sites. In the children's graves at Batina, there are graves without ceramic vessels used as recipients for food and drink (graves 52 and 36), as well as graves where entire sets of vessels were placed (graves 13, 19, 20, 53 and 90), which may have depended on the economic possibilities of the family or community organizing the burial, or perhaps even on the harvest yield or season. The organic residue analysis in the urn from grave 90 showed that, at least in this case, the urn was not a new

vessel, but rather a pot that had previously been used for cooking (meals with ruminant and non-ruminant animal meat, though it is unknown whether separately or together). Most of the vessels placed in the graves were also not new, made with the exclusive purpose of being grave goods, as they contain some lipids, and animal bones had been preserved in some of them. In most cases, it is likely that the same vessels that were used in everyday life, for cooking, storing, serving, or consuming food, were placed in graves. Since cooking, especially fatty foods, leaves the most significant organic traces on vessels,¹²² vessels with very weak or insignificant organic traces can be assumed to have been used only once for the burial, to place food offerings in the grave, rarely for serving food, or for storing something that did not leave strong organic traces during the lifetime of the deceased or for holding something that did not leave strong organic traces. This pattern of grave goods may also indicate greater differences or a stronger hierarchy within the community at Batina, which will be further clarified by analysing the graves under mounds, which differ from other contemporary graves in their burial structure and grave goods.

The relationship between children and the environment in which they grew up at Batina is not easy to reconstruct based on the available material traces. However, it can be assumed that children were surrounded by domestic and wild animals, as indicated by the results of preliminary archaeozoological analyses, as well as zoomorphic vessels or decorations on vessels, most commonly depicting birds.¹²³ Nevertheless, there is currently no other material proof aside from osteological remains associated with funerary rites (e.g., grave 90). These include confirmed cattle, pig, deer, and fish remains.¹²⁴

Organic residues from ceramic vessels in graves 20 and 90 show that the vessels contained non-ruminant (pig) and ruminant (cow, sheep, goat) animal fats and possibly beeswax, which aligns with the remains of animal bones, except that no fish remains were found in the ceramics. Some vessels from other graves also contained millet remains.¹²⁵ The contents of the

¹²¹ Metzner-Nebelsick 2002, 169–172, Abb. 73–74.

¹²² Charters et al. 199.3.

¹²³ Dizdar et al. 2019.

¹²⁴ Barbir 2022, 263.

¹²⁵ Metzner-Nebelsick et al. 2022.

vessels were most likely the common food of the community at Batina, including that of the children, and it is probable that the same ingredients were used during the funerary rite.

CONCLUSION

The data obtained from children's burials in the Batina cemetery, compared with that for the entire community in which they lived, provides insight into the conditions in which these children were raised. Older children and adolescents had already assumed certain roles in the community in accordance with their biological age, by assisting in daily activities, as is the case with the female (?) deceased from grave 19 in Batina and grave 128 in Doroslovo. The remains of costume, jewellery, tools, and vessels found in graves testify to funerary practices but also contribute to a partial reconstruction of the lives of these young individuals. In some cases, funerary practices show a personalization of objects corresponding to the perceived age of the deceased. Children lived in close connection with the surrounding natural environment. Since trauma and pathologies were rarely recorded, the causes of children's deaths remain unknown. In terms of quantity, the nutrition of children likely depended on age and perhaps on season. Rare costume items found in graves indicate age status or social status, even in early age groups. The stone tools, ceramic utensils, needles, and knives discovered in children's graves point to their contributions to the economy of the households in which they lived. Funerary practices suggest that children were laid to rest in the same manner as other members of the community, with individual pyres, urns, and burials in single graves, ex-

cept in two cases (grave 36 and grave 52). Almost all analysed vessels from two graves show at least minimal traces of lipids, which most likely means that they had previously been used either in settlements as containers for preparing, storing, serving, or consuming food (mainly animal-based, though millet and beeswax were also recorded) – which is especially true for those vessels with high lipid concentrations – or they may have been used in the funerary rite or feast, or as containers for grave food offerings, regardless of whether they were made for this purpose or repurposed. Even kitchen vessels served as urns, at least in some cases. It is likely that the same vessels used by the child or family during their lifetime were placed with them in the grave.

The analysed contexts and objects associated with children from Batina show that they were equal and important members of their community in the Danube region from the 11th to the 7th century BC.

Acknowledgements

We extend our gratitude to the team of the Archaeological Museum in Osijek, which conducted the field research at Batina, and especially to the director Tomislav Hršak and senior curator Domagoj Dujmić. We are grateful to Matilda Marijanović Lešić and Martina Rončević for the drawings of objects and to Bruno Jobst for the beautiful photographs. Katarina Botić provided the overview of the radiocarbon dating. This work has been supported in part by the Croatian Science Foundation under the project Childhood in protohistory in southern Carpathian Basin ARHKIDS (IP 2019-04-2520).

Translator: Marko Maras

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ДЕТИЊСТВО У БАТИНИ НА КРАЈУ КАСНОГ БРОНЗАНОГ И ПОЧЕТКОМ СТАРИЈЕГ ГВОЗДЕНОГ ДОБА

Кључне речи. – Батина, Подунавље, касно бронзано доба, рано гвоздено доба, гробови, деца, детињство, идентитет, начин исхране

Батина је вишеслојно налазиште смештено на истакнутом положају изнад Дунава, на крајњем североисточном рубу Банског брда у Барањи. Ради се о важном локалитету чија истраживања сведоче о насељености током касног бронзаног и почетком старијег гвозденог доба, од 11. до 7. века п. н. е. У Батини се некропола равних гробова са спаљеним индивидуама истражује од 2010. године, а до данас су истражена и три тумула. Укупно је досад истражено око 80 гробова из касног бронзаног и старијег гвозденог доба, од чега је антрополошки анализирано 25 и у њима је откривено 30 индивидуа свих старосних група, од којих је 9 деце (сл. 3). Већина истражених и анализираних гробова датирају се од краја касног бронзаног доба и у старије гвоздено доба (од 9. до 7. века п. н. е.). Засада најстарији документовани деčји гроб датован је у 12/11. век п. н. е. типолошко-хронолошким методом (сл. 4, 13), што потврђује и апсолутно AMS датовање (DeA-1203).

У проучавању археолошких контекста и налаза са локалитета Батина у овом случају примењен је теоријски оквир усмерен на дете и деčју перспективу, тзв. децoцентрични теоријски оквир (енг. *child-centred theoretical framework*), са свим изазовима и истакнутим отвореним питањима у откривању и дефинисању играчака као најпрепознатљивије категорије повезане с децом у археолошким контекстима. Документовани трагови деце – истражени гробови, случајно пронађени археолошки предмети – упоређени су с досадашњим спознајама о животу заједнице касног бронзаног и старијег гвозденог доба у Батини те истовременим, географски блиским налазиштима Сотин и Дорослово.

Детињство на налазишту Батина покушава да се дефинише комбинацијом биолошких и културолошких података, при чему се разматрају непосредни и посредни докази о присуству деце. Непосредни докази су гробови с остеоолошким остацима деце, а посредни сви остали материјални трагови и могућа тумачења контекста где су деца била присутна за свог живота.

Слика детињства у Батини током касног бронзаног и почетком старијег гвозденог доба уобличена је кроз анализу односа деčјег света према свету одраслих у заједници на основу истражених деčјих гробова и објављених случајних налаза. Следећи корак представља поређење с другим истовременим заједницама на географски повезаном простору Подунавља. То су већа истражена гробља с више од стотину

гробова: Сотин у Срему и Дорослово у Бачкој. Налазиште Сотин истраживано је од 2008. до 2018. године, при чему је истражено 119 гробова који се датирају од 9. до 7. в. п. н. е. Досад је остеоолошки анализирано 47 гробова, од чега је 16 деčјих. У Дорослову је истражено око 180 гробова, док је антрополошки анализирано 89 гробова, при чему је откривено 17 деце. Географска близина налазишта као и њихова истовременост омогућавају детаљније поређење теме истраживања између налазишта пошто обухватају различите крајолике овог дела средњег Подунавља.

Споменуто гробља приписана су даљској групи која је обележила млађу фазу касног бронзаног и почетне фазе старијег гвозденог доба на уском подручју хрватског Подунавља од Барање до западног Срема, углавном уз десну обалу Дунава, док је у Бачкој захватила и леву обалу.

Начин третирања тела у погребним обичајима даљске групе било је спаљивање. Тај процес утицао је на очуваност материјалних трагова који се проучавају на основу интердисциплинарних анализа.

Сви досад истражени гробови су са спаљеним индивидуама с карактеристичним погребним ритуалом полагања спаљених остатака у керамичку урну или неки органски реципијент. Понекад је запуна гроба око урне садржала остатке ломаче – угљен, гар, уломке растањених бронзаних предмета те сломљених керамичких посуда с врло ситним уломцима спаљених костију. Гробна рака била је величином прилагођена планираном сценарију покопа и избора гробних прилога. Деца су сахрањивана у појединачним гробовима, као и одрасли чланови заједнице. У три случаја откривени су остаци деце у двојним гробовима, два с одраслим особама (36, 52), те једном с другим дететом (90). На примеру двојног деčјег гроба 90 биће детаљније приказани погребни ритуали примењивани у Батини.

Деčји гробови издвојени су према резултатима антрополошких анализа те је одређена старост, која је за децу подељена у три категорије: до 5 година, од 6 до 11 година и од 12 до 20 година (сл. 6). Највећа смртност била је у најранијој доби, односно до 5 година, што одговара показатељима у другим заједницама. Остеолошки подаци показују патолошке промене које су се догодиле за живота и узраст у време смрти.

Деца су важан део сваког друштва, па их је потребно укључити у анализу како би се у потпуности разумела истраживана заједница. Разликује се биолошка старост, која

је одређена на остеолошким остацима, док је друштвена старост дефинисана према ношњи и ритуалима заједнице. Највећа смртност деце у Батини била је у узрасту до 5 година, када су деца била најрањивија група. Сличан тренд показују и налазишта Сотин и Дорослово. Трагови патолошких промена забележени су само на спаљеним остацима код детета у гробу 53 у Батини. Најмлађа деца најугроженији су део заједнице из неколико разлога. Један ризик је повезан с рођењем и проблемима који се тада могу појавити. Осим тога, проблем може бити и недовољно развијен имунолошки систем, који је више подложен инфекцијама, али и прелазак на чврсту храну, када деца такође могу бити изложена разним патогенима. Деца старија од 6 година део су заједнице која је преживела тај почетни опасни период повезан с рођењем и преласком на чврсту храну те су с временом постала самостални и пуноправни чланови своје заједнице.

Предмети повезани контекстом, величином или наменом с децом на Батини заступљени су у гробовима и случајним налазима. То су керамичке куглице, оруђе и накит те мање посуде у гробовима. Накит се појављује у гробовима деце старости 6–11 година, на пример накит за косу, а уобичајен је код особа старих 12–20 година, иако су ти гробови најређи. Оруђе се појављује исто у гробовима особа старости 6–11 година (кремене алатке, пршљени), да би оруђе у гробовима адолесцената већ било исто као у гробовима одраслих особа, на пример гвоздени ножићи, већи број пршљена и сл. У Сотину и у Дорослову у дејим гробовима пронађени су облаци те пробушени животињски астрагали, а често и пршљени који показују мало другачији избор прилога. Ова разлика може бити и због броја досад истражених и анализираних гробова. Стога су следећи закључци прелиминарни. Можда су деца у заједницама у Сотину и Дорослову морала раније да се укључе у различите дневне активности, па је у дејим гробовима пронађено више оруђа него у дејим гробовима у Батини.

У концепту полагања спаљених остатака у гроб у Батини приметна је чешћа употреба реципијената од органског материјала него керамичких посуда које су послужиле као урне у односу на Сотину и Дорослову. Концепт полагања прилога у гробове такође се мало разликује од оближњих налазишта. У дејим гробовима на Батини могу се уочити гробови без керамичких посуда које су служиле као реципијенти за храну и пиће (52, 36) те гробови (сл. 8) у које су положени читави сетови посуђа (13, 19, 20, 53, 90), што је можда зависило од економских могућности породице или заједнице која је приређивала испраћај или чак можда о приносу летине или сезонности. Анализа органских остатака урне из гроба 90 показала је да, барем у овом случају, није употребљена нова посуда с искључивом наменом да буде урна, него лонац који се претходно употребљавао за кување (јела с месом преживара и непреживара, непознато да ли засебно или заједно). Већина приложених посуда такође није била положена у гроб као нове с искључивом наменом да саме буду гробни прилог јер садрже нешто липида, а у неким су сачуване и животињске кости. У већини случајева вероватно су се употребљавале исте посуде као и у свакодневном животу – за кување, складиштење, послуживање или конзумацију хране. Будући да најјачи органски траг на посудама оставља кување, посебно масне хране, за

посуде с врло slabим или незнатним органским трагом може се претпоставити да су могле бити употребљене на пример само једном приликом погребља, за стављање прилога хране у гроб, врло ретко за послуживање или конзумацију хране или за чување нечега што не оставља јак органски траг за време живота покојника. Оваква слика распореда гробних прилога можда указује и на веће разлике или снажнију хијерархију у заједници у Батини, што ће бити додатно расветљено анализама гробова под тумулима који се разликују од осталих истовремених гробова гробном конструкцијом и прилозима.

Однос деце према околини у којој су одрастали на Батини није лако реконструисати према материјалним траговима, али може се претпоставити да су деца била окружена домаћим и дивљим животињама, на шта указују резултати прелиминарних археозоолошких анализа, те зооморфно обликоване посуде или украси на посудама, најчешће птица. Међутим, засад нема других материјалних доказа осим остеолошких остатака повезаних с гробним ритуалом (на пример гроб 90). Ту се ради о потврђеним остацима говеда, свиње, јелена и рибе.

Органски остаци из керамичких посуда из гробова 20 и 90 (сл. 9, 10) показују да су посуде садржавале животињске масти непреживара (свиње) и преживара (краве, овце, козе) и могући пчелињи восак, што се донекле поклапа с остацима животињских костију, осим што у керамици нису пронађени остаци рибе. У неким посудама из других гробова такође су пронађени остаци проса. Садржај посуда је највероватније била уобичајена храна заједнице у Батини, укључујући и децу, а вероватно је да су се исте намирнице употребљавале и током погребног ритуала.

Добијени подаци о деци покопаној на гробљу у Батини упоређени с онима за читава заједницу у којој су живела индицирају и у каквим су условима одрастала та деца. Старија деца и адолесценти према биолошкој доби већ су преузимали одређене улоге у заједници помажући у свакодневним активностима, нпр. покојница (?) из гроба 19 у Батини као и из гроба 128 у Дорослову. Остаци ношње и накита, те оруђа и посуђа у гробовима сведоче о погребним обичајима, али помажу и у делимичној реконструкцији живота малих покојника. У погребним обичајима се у неким случајевима може приметити персонализација предмета према доживљеној старости покојника. Деца су живела повезана с природом која их је окруживала. Ретко су забележене трауме и патологије на остеолошким остацима те узроци смрти деце остају непознати. Исхрана деце вероватно је била количином прилагођена узрасту, а можда и сезони. Ретки предмети ношње пронађени у гробовима сведоче о знаковима старосног или друштвеног статуса већ у раним старосним групама. Налази камених алатки, керамичког прибора, игала и ножева у гробовима деце сведоче о њиховом доприносу економији домаћинства у којима су живела. Погребни обичаји указују како су деца била испраћана као и остали чланови заједнице с индивидуалном ломачом, урном и полагана у појединачни гроб, осим у два случаја (гроб 36 и гроб 52). Готово све анализиране посуде из два гроба показују барем минималне трагове липида, што највероватније значи да су се претходно употребљавале или у насељу као посуда за припремање, складиштење, послуживање или конзумацију хране (углавном животињског порекла, али за-

бележни су и просо и пчелињи восак), што посебно важи за оне посуде с великом концентрацијом липида, или су се могле користити у погребном обреду или гозби, или као посуде у које су стављени прилози у облику хране, без обзира на то јесу ли за ту намену направљене нове или су секундарно употребљене. Чак су и као урне, барем у неким

случајевима, кориштене кухињске посуде. Вероватно су исте посуде које су дете или породица користили за живота стављени с њима и у гроб.

Анализирани контексти и предмети повезани с децом из Батине показују да су деца била равноправни и важни чланови заједнице у Батини у Подунављу од 11. до 7. века п. н. е.

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LATE HALLSTATT FEMALE HEAD/HAIR DECORATION IN DONJA DOLINA AND THE SOUTHERN CARPATHIAN BASIN (II)

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Abstract. – Various kinds of temple rings played an important role in female body decoration in the southern Carpathian Basin during the Early Iron Age. Based on finds from graves, especially at the cemetery in Donja Dolina, four basic types of temple rings have been distinguished, according to differences in the design of their terminals, while different variants were recognized based on the method of shaping of the body. Temple rings were most commonly made of a copper alloy, but during the Late Hallstatt period, silver temple rings with twisted bodies also appeared. As the finds show, particularly in older graves at Donja Dolina, combinations of different temple rings were often worn, whereas temple rings of the same shape appear more frequently in younger graves. After analysing temple rings of the Ciurbrud and Donja Dolina types, we examine two other basic types with variants found in women's graves in the southern Carpathian Basin. These temple rings are rare outside this area, which may indicate cultural connectivity between different Late Hallstatt communities, possibly including matrimonial alliances. Notably, they are common in the Donja Dolina cemetery. Conversely, they appear in smaller numbers in graves of the Symian group in the Danube region, mostly as the silver twisted-body type, which is the youngest form. The wearing of different temple rings throughout almost the entire Early Iron Age, and even at the very beginning of the Late Iron Age, testifies to the fact that they were an important part of the visual identity of women and constituted an integral element of Late Hallstatt female body decoration.

Key words. – female head/hair jewellery, temple rings, Early Iron Age, southern Carpathian Basin, female bodily decoration, identity, connectivity

An earlier article,¹ analysing temple rings of the Ciurbrud and Donja Dolina types, outlined the spatial and chronological frameworks of the southern Carpathian Basin, which was marked by a heterogeneous material legacy attributed to different cultural groups during the later phase of the Early Iron Age.² Cemeteries of that period have not been systematically researched, or most often consist of cemeteries with only a few graves. An exception so far is the cemetery in Donja Dolina, which lasted until the Late Iron Age, and the cemetery of Szentlőrinc, which is dated to the very end of the Early Iron Age. The level of research is what determines the knowledge of the material legacy that can be dated from the middle of the 7th century BC up to the beginning of

the Late Iron Age, at the beginning of the last third of the 4th century BC. However, the discovery of graves with items of female costume and jewellery has made it possible to follow the development of the material legacy over this long period, indicating the directions and intensity of cultural connectivity. One of these forms, as the previous analysis has shown, is represented by finds of temple rings, which were an important part of the visual identity of the women who

¹ This article was funded by the Croatian Science Foundation within the project (IP-06-2016-1749): Iron Age Female Identities in the Southern Carpathian Basin (FEMINE).

² Dizdar, Kapuran 2021, 149–152.

wore them. The finds from the southern Carpathian Basin reveal a long tradition of decorating the head/hair with different forms of temple rings, which continued until the end of the Early Iron Age and even into the beginning of the Late Iron Age.³

Temple rings, as an important element in female bodily decoration during the Late Hallstatt period, together with other items of costume and jewellery, were a prominent external marker highlighting different aspects of women's social identities. Their analysis, along with other items from grave assemblages, shows that they were a recognizable gender-specific type of jewellery that could also indicate the social status of the women who wore them. Although anthropological analyses are lacking for most graves,⁴ especially for the cemetery in Donja Dolina, the collected data may also point to the existence of an age concept, that is, a particular age of the women who adorned their head/hair with various temple rings. These provide some of the answers to the research questions posed in the previous analysis, which will also be addressed by analysing the other two basic types of temple rings with variants.

TYPOLICAL CLASSIFICATION

The previous paper analysed temple rings of the Ciurbrud (type A) and Donja Dolina (type B) types, which often appear together within the same grave assemblages in the Donja Dolina cemetery. Their occurrence, along with other items of female costume and jewellery, testifies to a reconfiguration in female bodily decoration in the southern Carpathian Basin that took place at the end of the first half and around the middle of the 7th century BC. Certain graves in Donja Dolina contained not only these temple rings, but also others of different forms, most often of the C1 variant. This time, the subject of analysis are temple rings of the other two distinguished types with variants (types C and D), which were most often made of copper alloy, and only rarely of silver (Fig. 1). The recognized types have been distinguished primarily on the basis of finds from the Donja Dolina cemetery, which stands out by virtue of the number and diversity of temple ring forms.⁵ This knowledge is supplemented by finds from other sites in the southern Carpathian Basin. Since these are most often finds from inhumation graves, similar to temple rings of types A and B, it is known that they were worn on both sides of the heads of the deceased women over several centuries of their use – that is, they probably adorned the hair. This is also

evidenced by descriptions of inhumation graves 3a from the ridge of N. Čegrlja and grave 1 from the garden of N. Šokić, in which temple rings were found on both sides of the heads of the deceased women, at the level of the temples.⁶

Based on finds from Donja Dolina and other sites in the southern Carpathian Basin, temple rings have been classified into four basic types according to the way their terminals are shaped (Fig. 1). Certain types can be further divided into variants based on the method of shaping the body, which can be: 1) smooth; 2) ribbed on the outside; 3) twisted.⁷

Type C temple rings are characterised by tapered ends, with the body narrowing toward the terminals. Based on the body shaping, three variants are distinguished: smooth temple rings (variant C1); temple rings ribbed on the outside (variant C2); temple rings with a twisted body (variant C3). Type D temple rings feature flat and, more or less, twisted terminals, either one (type D1) or two (type D2). Based on body shaping, type D1 temple rings also divide into three variants: smooth body (variant D1a); externally ribbed body (variant D1b); twisted body (variant D1c). Type D2 temple rings, with both terminals flat and twisted, have a smooth body. Type D3 is a distinct type of silver temple ring that can be divided into two variants: twisted body with slightly widened terminals (variant D3a); twisted body with one smooth point and one twisted terminal (variant D3b).

As in the previous analysis of type A and B temple rings, it should be noted that some temple rings – particularly those from the Donja Dolina cemetery – are not fully preserved, especially at their terminals, making it difficult to confidently determine their specific

³ Analyses of women's head and hair jewellery have been conducted for the northern Carpathian Basin (Kemenczei 2002; Ilon 2017; Kozubová 2018; 2019 etc.) and Lower Carniola (Tecco Hvala 2007; 2012, 327–333, Fig. 122; Pavlovič 2018).

⁴ The results of anthropological analyses are known only for some excavated cemeteries with finds of temple rings, e.g., Szentlőrinc and Alsónyék.

⁵ Special thanks are due to our colleague Dr Andrijana Pravidur, who was employed at the National Museum in Sarajevo and verified the forms of temple rings from the Donja Dolina cemetery.

⁶ Truhelka 1904, 84–85, Fig. 65, Pl. XL. Also: Parzinger 1992, 217, 220, Fig. 2.

⁷ Dizdar, Kapuran 2021, 152–154, Fig. 1. M. Gavranović also recognizes three basic types: with conical expansion at the terminals; with one twisted terminal; with tapered terminals (Gavranović 2011a, 216–217, Fig. 217).

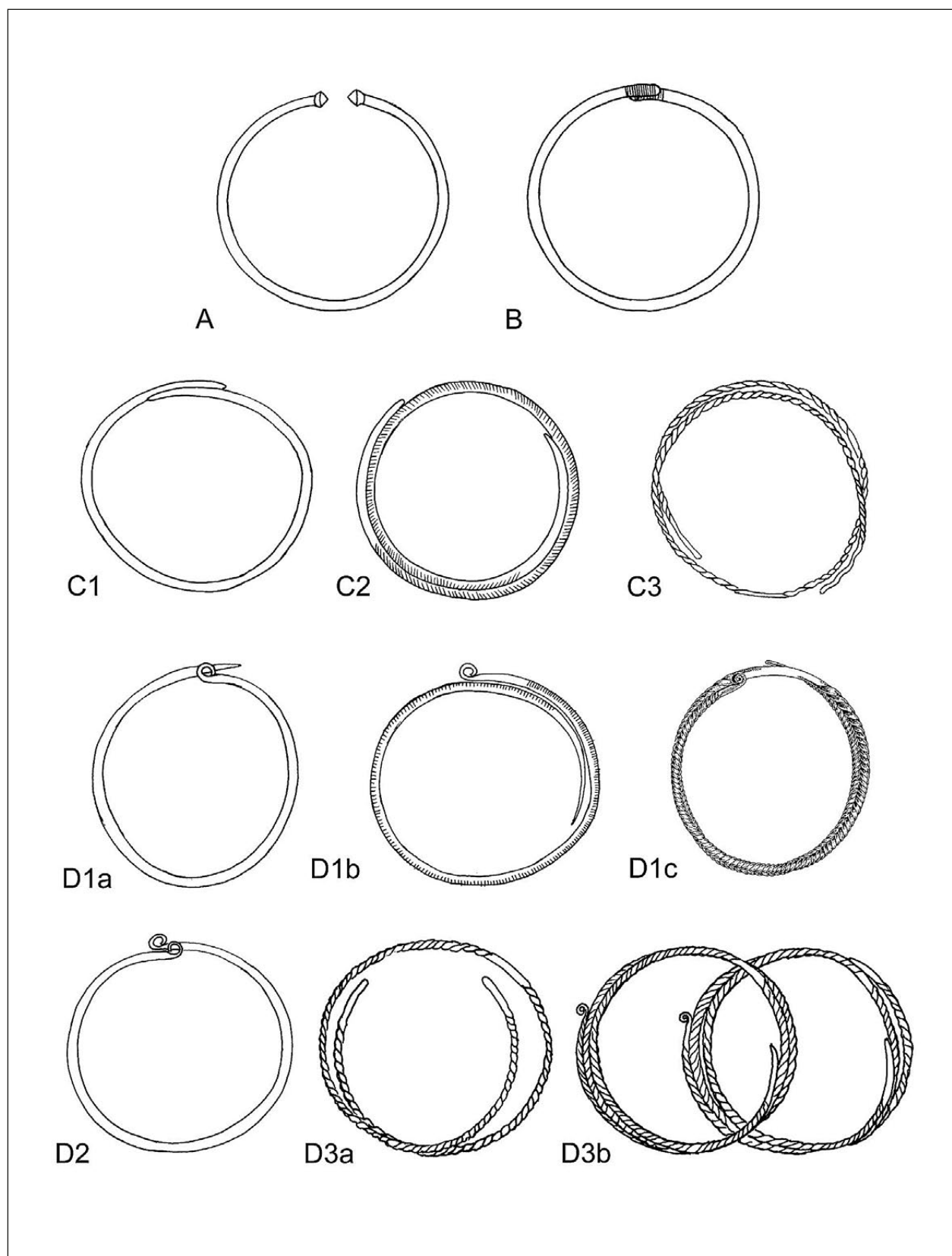


Fig. 1. Types of temple rings at the Donja Dolina cemetery (made by: A. Kapuran)

Сл. 1. Тијови слејоочничарки са некрјоле у Доњој Долини (црџао: А. Капуран)

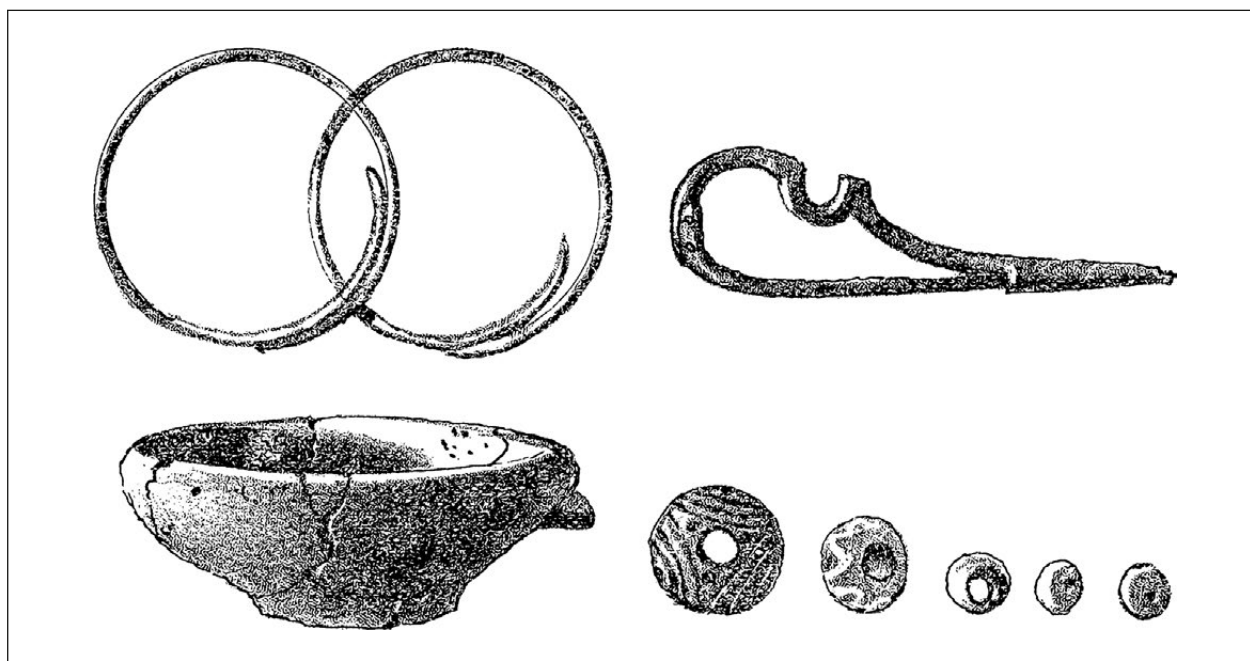


Fig. 2. Grave 62a from the ridge of M. Petrović Jr. at the Donja Dolina cemetery (after: Truhelka 1904)

Сл. 2. Гроб 62 са Греге М. Петровића м.л. на некрополи у Доњој Долини (према: Ћ. Трухелка 1904)

type or variant. Additionally, temple rings of variant C1 in Donja Dolina graves frequently appear alongside the already analysed types A and B, while some other forms appear only rarely with these two types.⁸ For this reason, previously analysed costume and jewellery items from graves with type A and B temple rings will not be reiterated here.⁹ The chronological determination of the remaining distinguished types and variants also relies on grave assemblages where they appear alongside other costume and jewellery items, which will also undergo typological-chronological analysis.¹⁰ Notably, some temple rings from the Donja Dolina cemetery do not belong to any of the defined types and will be analysed separately. These may represent imports from neighbouring regions where similar items were used to adorn women's hair.

Variant C1: smooth temple rings with tapering terminals

Variant C1 temple rings have a smooth body, most often with a round cross-section (rarely oval), tapering toward the ends. Only the temple rings from grave 4 at the ridge of N. Šokić II have terminals shaped more conically on both sides, resembling type B. Due to poor preservation, this terminal shape difference often cannot be reliably used to distinguish two distinct sub-

variants. The ends of rings from older graves are typically slightly overlapped (e.g., M. Petrović Jr. grave 3 or S. Jakarić grave 14), while those from younger graves show more pronounced overlapping or even double-twisted bodies (e.g., M. Petrović Jr. grave 31).

Variant C1 temple rings at the Donja Dolina cemetery appear as the only form in just one grave (M. Petrović Jr. grave 62a) (Fig. 2). Most often, they were worn in combination with type A1 temple rings or, somewhat less frequently, in combination with types A1 and B. Only S. Jakarić grave 14 contained them together with type B. Additionally, they very rarely occur in combination with other forms of temple rings in graves that are younger than those where they are found with types A1 and B (Tab. 1; Tab. 3).

Another interesting aspect is the way temple rings of variant C1 are worn when they appear in combination with other forms (Tab. 1): notably, they most often occur in equal numbers on both sides of the head.

⁸ Dizdar, Kapuran 2021, Tab. 1; 3.

⁹ Dizdar, Kapuran 2021, 177–197, Tab. 4–5.

¹⁰ For finds of temple rings of types C and D with variants from the Donja Dolina cemetery, as well as data on other finds of costume and jewellery items in grave contexts and bibliographic references, see Tab. 1–2.

VARIANT C1								
Grave	Ritual	Age	No.	Diam. in cm	Other types of hair-rings in grave and their number	Other important costume items	Other important jewellery items	References
M. Petrović Jr. grave 3	INH	adult	1+1	7.1 7.6	A // 1+1? B // 1+1 indeterminate // 3	boat-shaped fibula, fibula with amber coating (2), plate fibula, belt set with buckle and buttons	torque, bracelet with stamp-shaped terminals (2)	Truhelka 1904, 90–91, T. XLII/12–13; Marić 1964, 35, T. XXV/4; Gavranović 2011b, 136, Abb. 172/2–3.
M. Petrović Jr. grave 6	INH	adult	4	6.4–8.0	A // 1+1 B // 5 D2 // 1	fibula with the foot shaped like the Boeotian shield (2), Borajna-type fibula, fibula with a loop at the top of the bow (2), belt set with buckle and buttons, silver pin	torque, amber beads, spiral bracelet (2)	Truhelka 1904, 91–92, T. XLIII/10–11; Marić 1964, 40, T. XXV/6.
M. Petrović Jr. grave 31	INH	adult	6	5.7–6.3	C2 // 2 D1a // 2	serpentine fibula	amber beads	Truhelka 1904, 97, T. XLVI/16–17.
M. Petrović Jr. grave 62a	INH	adult	3	5.0–5.3		serpentine fibula	amber beads, glass beads	Truhelka 1904, 105, T. LIII/27.
S. Jakarić grave 14	CREM		7	7.0–7.9	B // 5		torque (2), bracelet with stamp-shaped terminals (2)	Truhelka 1904, 107–108, T. LV/3; LVI: 6; Marić 1964, 40, T. XXV/10.
M. Petrović grave 2	CREM	adult	1	7.8	A // 2+1	fibula with the foot shaped like the Boeotian shield (2), plate fibula, fibula, belt buckle	torque (2)	Truhelka 1904, 118; Čović 1961, Y22/8–11; Gavranović 2011b, 128, Abb. 158/8–11.
M. Petrović grave 3	INH	adult	x	7.0	A // X	plate fibula (2), boat-shaped fibula (2), Donja Dolina-type pin	torque, spiral bracelet (2)	Truhelka 1904, 118–119.
M. Petrović grave 5	INH	adult	1+1	6.0	A // 1+1			Truhelka 1904, 120; Čović 1987a, 246, T. XXVI/11.
M. Petrović Sen. grave 4	INH	adult	2+2	7.2–8.0	A // 2+2	fibula with a loop at the top of the bow, belt set with buckle and buttons	torque, glass beads	Truhelka 1904, 122–123, T. LXVIII/12, 15.
I. Stipančević grave 14	INH	adult	1+1		C2 // 1 indeterminate // 2	serpentine fibula	bronze pendant (7)	Truhelka 1904, 131.
N. Šokić II grave 2	INH	adult	1		A // 1+1			Truhelka 1904, 132–133.
N. Šokić II grave 4	INH	adult	3+3	8.0	A // 1+1	double-looped fibula with a triangular foot, plate fibula, open-work belt, calotte-shaped buckle with petals	amber beads, bronze bracelet (2)	Truhelka 1904, 133–134; Marić 1964, 40, T. XXV/9.
VARIANT C2								
M. Petrović Jr. grave 31	INH	adult	C2 // 2	5.7–6.3	C1 // 6 D1a // 2	serpentine fibula	amber beads	Truhelka 1904, 97, T. XLVI/16–17.
I. Stipančević grave 14	INH	adult	C2 // 1		C1 // 1+1 indeterminate // 2	serpentine fibula	bronze pendant (7)	Truhelka 1904, 131.
N. Šokić 139	INH	adult	C2 // 2	3.0 6.0				Truhelka 1904, 117, T. LXVII/4–5.
VARIANT C3								
S. Jakarić 20	INH	adult	C3 // 9	7.0			amber beads	Truhelka 1904, 109, T. LVII/6–7.

Tab. 1. Graves from Donja Dolina containing temple rings of variants C1, C2, and C3 with finds of costume and jewellery items (made by: M. Dizdar)

Таб. 1. Гроби са некрополе у Доњој Долини са слепоочничаркама у варијантима C1, C2 и C3 са налазима предметна ношње и накита (направио: М. Диздар)

When there are one, two, or three temple rings of variant C1 on each side of the head, they usually combine with those of type A1 or types A1 and B, and exceptionally in combination with variants C2 and D1a. Finds of only a single temple ring of variant C1 in a grave, appearing with those of type A1, are rare. Their diameters range from 4.2 to 8.0 cm, but it seems that those from older graves are larger, with diameters from 6.0 to 8.0 cm, while the younger ones are smaller, with diameters from 5.0 to 6.3 cm.

In the southern Carpathian Basin, temple rings of variant C1 are so far known only from the cemetery in Donja Dolina, where they appear in inhumation graves of adult women, while exceptionally they also occur in cremation graves. Notably, they are found in more richly furnished graves that stand out by virtue of the number of other costume and jewellery items (Tab. 1) and belong to an older burial phase: phases 2a and 2b, after B. Čović; or phases 2 and 3, after B. Teržan. They are also found in graves with serpent-shaped fibulae (phase 2c or phase 4), which would correspond to younger graves.¹¹

Other finds of temple rings of variant C1 are only known from two inhumation graves at the Ozd–Piscul Deagului cemetery, located in the Ozdului river valley. This cemetery, with 16 inhumation graves dated to the beginning of the 6th century BC, contained a large number of temple rings of type A1.¹² In grave 6, where a girl of about six years old was buried, two bronze temple rings of round cross-section were found. One was located beneath the lower jaw, and the other beneath the head. It appears that the ends taper, and on one they are slightly apart, while the other has ends that are slightly overlapped.¹³ Elsewhere, in grave 9, an adult woman was buried, with one bronze temple ring with slightly overlapped and tapered ends on each side of her head. Both have a D-shaped cross-section and a diameter of 5.8 cm.¹⁴ These temple rings are attributed to a second type, alongside those of type A or Ciumbud, and are also considered characteristic of the Ciumbud group.¹⁵

Variant C2: temple rings with tapering terminals and ribbed on the outside

Temple rings of variant C2 have an externally ribbed, round-sectioned body that tapers towards the ends. At the Donja Dolina cemetery, they appear in only two female inhumation graves (Tab. 1). M. Petrović Jr. grave 31 included two temple rings with strongly overlapping terminals, almost doubly twisted, and

ribbed on the outside at one end. It is likely that there was one temple ring of this shape on each side of the woman's head. In total, the woman wore five pairs of temple rings, which also included variants C1 and D1a. Their diameters are 6.0 and 6.3 cm; the grave is dated to phase 2c. It is probable that one temple ring of this shape was in I. Stipančević grave 14, together with those of variant C1 and indeterminate form. This grave is also from phase 2c. Another find of a temple ring of this variant is known from the settlement at Gradina, with a diameter of 9.0 cm, dated to phase IIb.¹⁶ Two more temple rings from N. Šokić I grave 39 may also belong to this variant. However, it is questionable whether their terminals have been completely preserved; if one end was hammered and twisted, then they would belong to variant D1b. One temple ring has more strongly overlapping terminals and a diameter of about 6.0 cm. The other is smaller, with two coils and a diameter of about 3.0 cm. Both temple rings have a smooth, undecorated section in the middle of the body. This grave also probably belongs to phase 2c.¹⁷

Variant C3: temple rings with tapering terminals and a twisted body

Temple rings of variant C3 have a twisted, round-sectioned body that tapers towards the ends. At the Donja Dolina cemetery, they appear only in S. Jakarić inhumation grave 20, dated to phase 2c (Tab. 1). This grave contained as many as nine temple rings of this shape, each with a diameter of 7.0 cm. They have overlapping terminals and a short smooth section in the

¹¹ For the chronology of the Donja Dolina – Sanski Most group and its comparison with the chronologies for Glasinac and Lower Carniola during the Early Iron Age: Čović 1987a, 238–262. A somewhat different chronology of the Donja Dolina cemetery: Teržan: 1974, 43–45, Fig. 7. For all previous chronological divisions of the Donja Dolina cemetery: Gavranović 2011b: 128–139.

¹² Vasiliev, Zrínyi 1974; Dizdar, Kapuran 2021, 163, Tab. 2, Fig. 13.

¹³ Vasiliev, Zrínyi 1974, 92, Pl. IVb; XI/10–11. The grave also contained an iron knife, a saltaleone, a smooth ring, and a ring with four protrusions, probably part of a belt, cowrie shells, conical beads, and ceramic vessels.

¹⁴ Vasiliev, Zrínyi 1974, 94, Pl. VIa; IXb; XIII/16–17. The grave also contained a pot, a cup, cowrie shells, glass beads, and an amber bead.

¹⁵ Vasiliev, Zrínyi 1974, 112–113.

¹⁶ Marić 1964, 36, Pl. X/1. Perhaps this variant also includes a find from the cemetery: Marić 1964, 40, Pl. XIV/3.

¹⁷ Truhelka 1904, 117, Pl. LXVII/4–5.

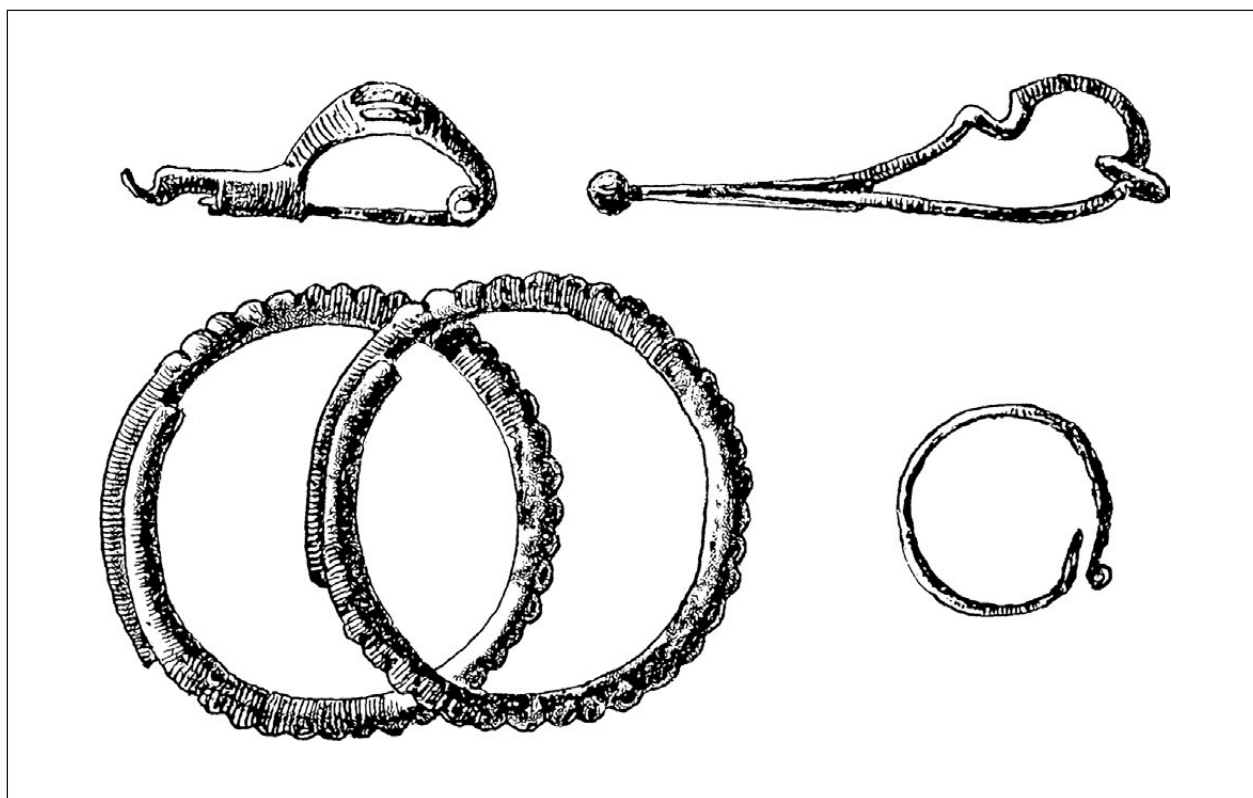


Fig. 3. Grave 15 from the ridge of S. Jakarić at the Donja Dolina cemetery (after: Truhelka 1904)

Сл. 3. Гроб 15 са Греге С. Јакарића на некрополи у Доњој Долини (према: Трухелка 1904)

central part. Similar to the finds of the previous variant, they could actually be temple rings of variant D1c, but missing one hammered and twisted terminal. However, the fact that the woman wore as many as nine temple rings of the same shape suggests that these are indeed temple rings of variant C3. It is also notable that temple rings with an externally ribbed or twisted body – regardless of whether they belong to type C or D – often had a smooth section in the middle of the body and smooth terminals.

Variant D1a: smooth temple rings with a twisted terminal

Temple rings of variant D1a have a smooth, round-sectioned body. One terminal tapers, while the other is hammered and twisted. It appears that temple rings from older graves at Donja Dolina have a slightly bent terminal, while those from younger graves feature a longer, hammered and, subsequently, twisted terminal. The terminals may be slightly or more strongly overlapping, while those from M. Petrović Jr. grave 31 are nearly doubly twisted (Tab. 2).

Temple rings of this shape appear as the only form solely in N. Šokić II grave 5, meaning there were likely two on each side of the head of a child, who was richly equipped with other costume and jewellery items. They have a diameter of only 2.5 cm. In other graves, they occur in combination with other shapes, always one or two temple rings of variant D1a on each side of the woman's head, that is, they were worn in pairs (Tab. 2). Their diameters range from 3.3 to 6.7 cm, with those from M. Petrović Jr. grave 31 being the largest, at 6.0 and 6.7 cm. This shape may include a small temple ring with a diameter of just 3.2 cm from the settlement at Donja Dolina.¹⁸

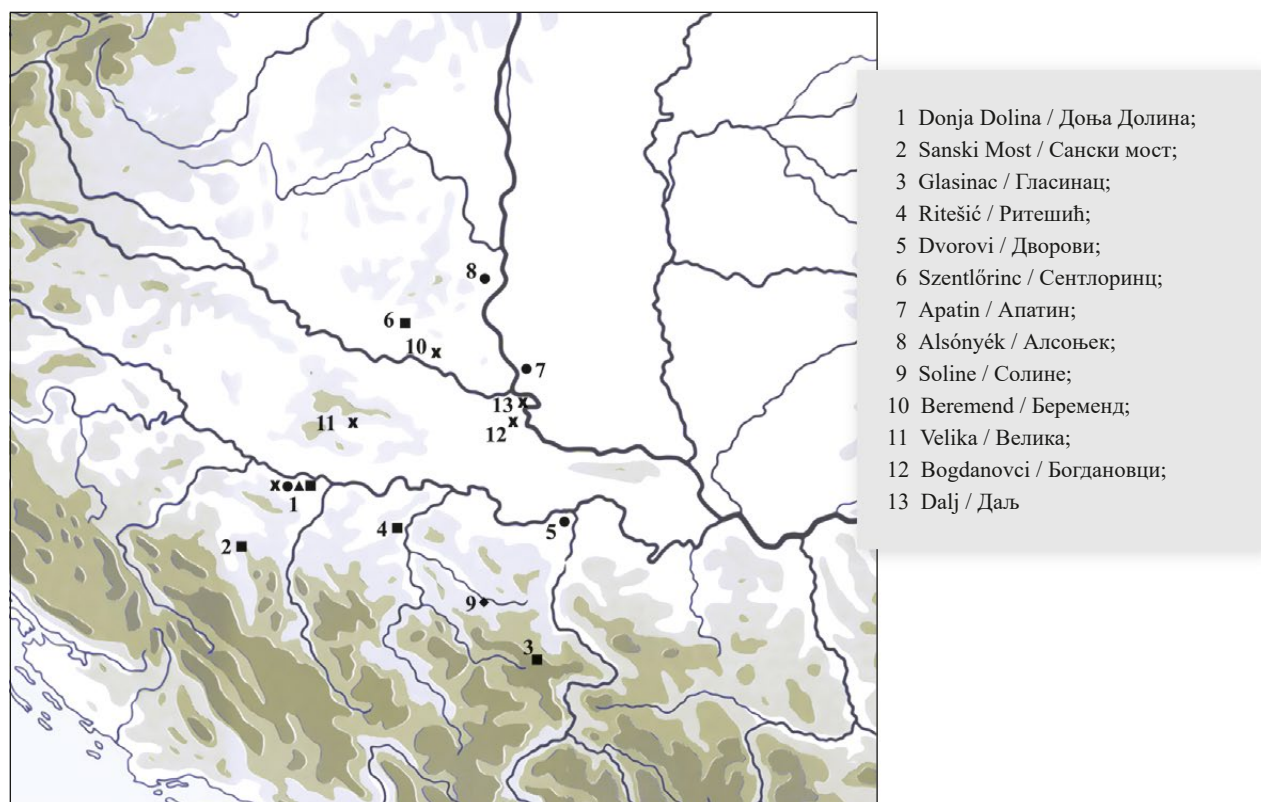
The older group of richly furnished graves at Donja Dolina with temple rings of variant D1a is dated to phases 2a and 2b, or to phases 2 and 3. Conversely, in the younger graves, they are found together with serpentine fibulae, which are characteristic of phase 2c, or phase 4 (Fig. 3).

¹⁸ Truhelka 1904, 73, Pl. XXXVIII/23.

VARIANT D1a								
Grave	Ritual	Age	No.	Diam. in cm	Other types of hair-rings in grave and their number	Other important costume items	Other important jewellery items	References
M. Petrović Jr. grave 31	INH	adult	2	6.0–6.7	C1 // 6 C2 // 2	serpentine fibula	amber beads	Truhelka 1904, 97, T. XLVI/16–17.
S. Jakarić grave 15	CREM		2+2	3.3–3.9	twisted // 1	Rusanovići-type fibula, serpentine fibula	bronze ribbed bracelet (2)	Truhelka 1904, 108, T. LVI/11; Čović 1987a, 252, T. XXVII/12; Gavranović 2011b, 139, Abb. 176/4.
M. Petrović Sen. grave 6	CREM		1+1	5.0	indeterminate / 1		torque (4), spiral bracelet (2), bracelet with stamp-shaped terminals (2), spear (2)	Truhelka 1904, 123, T. LXIX/9; Marić 1964, 40, T. XIV/16.
M. Petrović Sen. grave 10	INH	adult	1+1	4.2	D1b // 1+1 indeterminate / 3	double-looped fibula with a triangular foot, belt set with bronze tubes, bronze chain,	torque, amber beads, bronze bead, bronze bracelet (2), pendant (3), bronze ring (3)	Truhelka 1904, 125, T. LXXII/7, 11, 14; Čović 1961, Y21/9–11, 12–14, 15–17; Gavranović 2011b, 128, Abb. 157/9–10.
N. Šokić II grave 5	INH	child	4	2.5		plate fibula, boat-shaped fibula, fibula with a loop at the top of the bow (2), a tre bottomi fibula (4)	bronze bracelet (3), bronze ring, horse gear separator	Truhelka 1904, 134, T. LXXVII/25, 30.
VARIANT D1b								
M. Petrović Jr. grave 12	INH	adult	2+2	3.5	indeterminate // 1	Certosa IIa-type fibula, Certosa XIIIc-type fibula	bronze chain	Truhelka 1904, 92–93.
M. Petrović Jr. grave 28	INH	child	7	2.7–3.5	twisted ring / 1	serpentine fibula	bull's pendant	Truhelka 1904, 96, T. XLV/21–22.
M. Petrović Jr. grave 32	INH		7	4.2				Truhelka 1904, 97, T. XLVII/2.
M. Petrović Jr. grave 35	INH	adult	5+5	5.0–5.2		Arareva gromila-type fibula (2), plate fibula, serpentine fibula (3), belt set with buckles, cross-shaped buckle	amber beads, ribbed bronze bracelet (2)	Truhelka 1904, 97–98, T. XLVIII/4–5; Čović 1961, Y27/7–16; Marić 1964, 43, T. XIV/1; XXVI/18; Gavranović 2011b, 131, Abb. 163/7–16.
M. Petrović Jr. grave 44	INH	adult	1	2.7			bead	Truhelka 1904, 101, T. L/34.
M. Petrović Jr. grave 59	INH	adult	6	5.2–5.5		belt set with buckles	glass beads, bronze bead	Truhelka 1904, 104–105, T. LIII/18–19.
M. Petrović Sen. grave 10	INH	adult	1+1	4.3–5.5	D1a // 1+1 indeterminate // 3	double-looped fibula with a triangular foot, belt set with bronze tubes, bronze chain,	torque, amber beads, bronze bead, bronze bracelet (2), pendant (3), bronze ring (3)	Truhelka 1904, 125, T. LXXII/7, 11, 14; Čović 1961, Y21/9–11, 12–14, 15–17; Gavranović 2011b, 128, Abb. 157/9–10.
M. Petrović Sen. grave 16	INH	adult	5+5	6.3–7.3		plate fibula, boat-shaped fibula, belt set with buckle and buttons	amber beads, glass bead	Truhelka 1904, 126; Čović 1961, Y23/1–10; Marić 1964, 43, T. XXVI/17; Čović 1987a, 246, T. XXVI/12; Gavranović 2011b, 129, Abb. 160/1–10.
VARIANT D1c								
M. Petrović Jr. grave 9	INH	adult	4+4	4.2–4.9	twisted ring / 1	Certosa IIa-type fibula, Certosa V-type fibula, Sanski Most-type fibula (?)		Truhelka 1904, 92, T. XLIV/6–7; Čović 1961, Y28/5–12; Marić 1964, 43, T. XXVI/25; Gavranović 2007, 413, Abb. 11/4–5; Gavranović 2011b, 131, Abb. 164/2–9.
M. Petrović Jr. grave 30	INH	adult	9	5.8–6.0			amber beads	Truhelka 1904, 96–97, T. XLVI/7–8; Čović 1987a, 252, T. XXVI/11.
M. Petrović Jr. grave 34	INH	adult	4+?	4.6–5.0		serpentine fibula (3)	three foil-shaped pendant, pendants (2)	Truhelka 1904, 97, T. XLVII/11–12; Gavranović 2011b, 138, Abb. 175/1–2.
M. Petrović Jr. grave 43	INH		2	5.3–5.8		ribbed bow fibula, Zagrade-type fibula, Early La Tène fibula	amber beads, glass beads, bronze pendants	Truhelka 1904, 101, T. L/20–21; Marić 1964, 46, T. XXVI/32.
N. Šokić I grave 13	INH	adult	4	5.0		plate fibula	glass beads	Truhelka 1904, 112, T. LXII/3–4; Marić 1964, 43, T. XXVI/16.
N. Šokić I grave 26	INH	adult	X			plate fibula, fibula with band-shaped bow, Certosa IIc-type fibula	glass beads	Truhelka 1904, 115; Marić 1964, 43, T. XXVI/23.

Tab. 2. Graves from Donja Dolina containing temple rings of variants D1a, D1b, and D1c with finds of costume and jewellery items (made by: M. Dizdar)

Tab. 2. Гробови са некрополе у Доњој Долини са слепоочничаркама у варијантима D1a, D1b и D1c са налазима предмета ношње и накити (направио: М. Диздар)



Map 1. Distribution of finds of temple rings of variants D1a (■), D1b (▲), D1c (●), D3a (◆), and D3b (x) (made by: M. Dizdar)

Карта 1. Распространености слейоочничарки варијанти D1a (■), D1b (▲), D1c (●), D3a (◆) и D3b (x) (направио: М. Диздар)

Apart from Donja Dolina, temple rings of this shape have also been found at several other cemeteries, indicating that this is a simple and widespread form compared to other types of temple rings (Map 1). At the Sanski Most cemetery, temple rings of variant D1a were found in four inhumation graves. Double grave 17, with the burial of a woman and child, dated to phase 3a-2, included a smooth, round-sectioned temple ring, almost doubly twisted, next to the woman. One end is hammered and twisted into a loop, while the other tapers (Fig. 4). Its diameter is 5.5 cm.¹⁹ In grave 73, two bracelets (?) are reported, one of which has a bent terminal; they could also be temple rings of this variant.²⁰ Double grave 122, with the burial of a woman and a child (laid on the left side of the woman's chest), contained two round-sectioned temple rings next to the child, almost doubly twisted, with one terminal hammered and twisted into a loop and the other slightly bent.²¹ Grave 133, dated to phase 3a-2, included two more temple rings of different di-

ameters. Their terminals are overlapping; the smaller ring has a preserved hammered and twisted terminal.²² Temple rings of variant D1a, which appear to have been worn on the forearms, are not considered characteristic of the Sanski Most cemetery,²³ as indicated by the number of finds relative to the number of

¹⁹ Fiala 1896, 227, Fig. 23; 1899a, 70–71, Fig. 24; Čović 1987a, 258, Pl. XXVIII/12; Gavranović 2011b, 180, Fig. 251/5. According to A. Pravidur, the grave contains fragments of two more temple rings without preserved terminals. The grave also contained four Certosa fibulae of type XIIIc, a large number of glass beads, three amber beads, and four ceramic vessels.

²⁰ Fiala 1896, 245; 1899a, 83–84. The grave also contained a Certosa fibula, glass beads, a knife, a clasp, a spindle whorl, and a jug.

²¹ Fiala 1896, 262, Fig. 133; 1899a, 98, Fig. 134. The grave also contained two Certosa fibulae of type XIIIh, 27 small bronze buttons with one large tutulus, a kantharos, a jug, and a bowl.

²² Fiala 1896, 266; 1899a, 101. The grave also contained two Certosa fibulae of type VIII, 33 small bronze buttons, and two cups.

²³ Fiala 1899a, 115; Soós 2020a, 77–78.

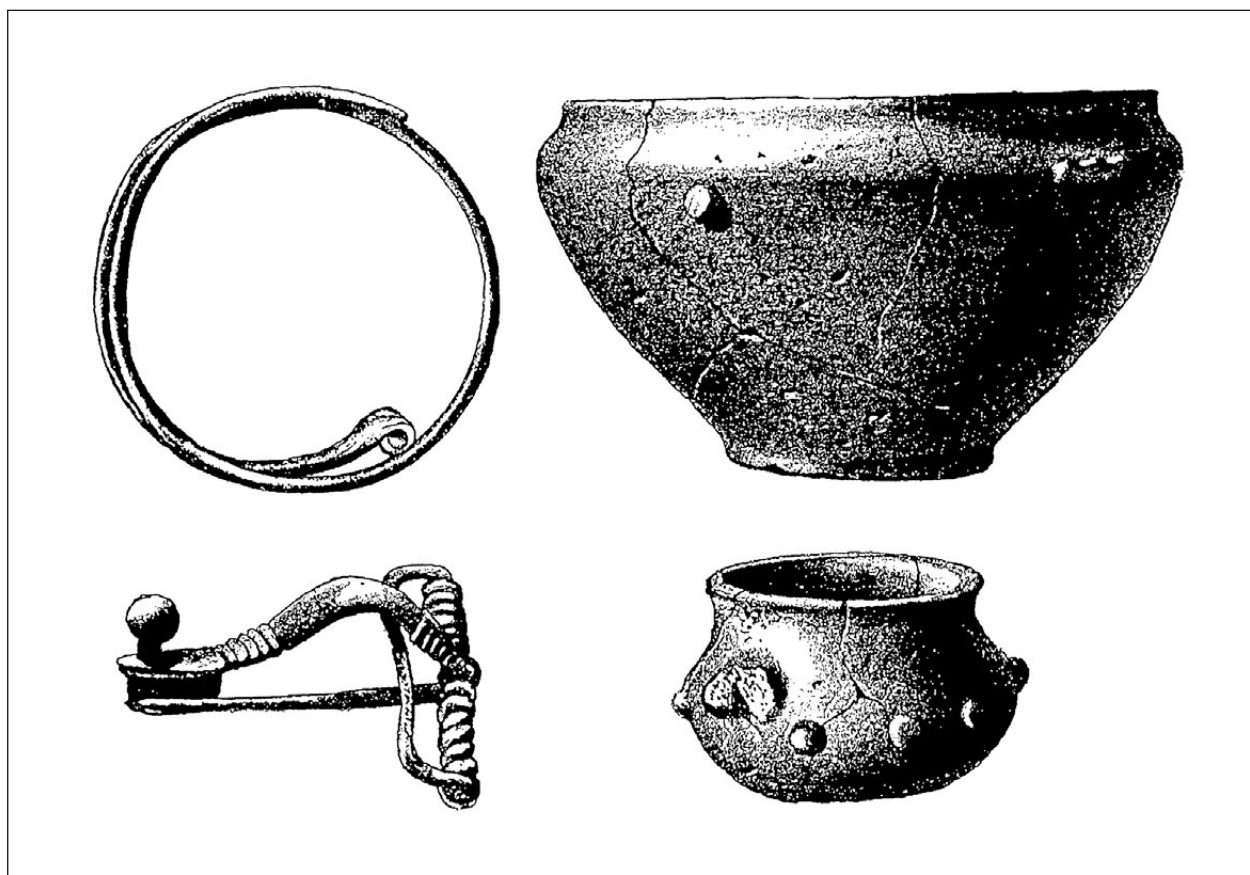


Fig. 4. Grave 17 from the Sanski Most cemetery (after: Fiala 1899a)

Сл. 4. Гроб 17 са некрополе у Санском Мосћу (према: Фиала 1899а)

discovered graves. It is notable that only a single pair of temple rings is found in each grave, which differs from the situation at the Donja Dolina cemetery. At the Sanski Most cemetery, bronze two-part temple rings are much more common; these are found on both sides of the women's heads and, according to F. Fiala, could have been worn in braided hair. These temple rings are most numerous in the Lika region, where they appear earlier, at the end of the Late Bronze Age and the beginning of the Early Iron Age, while at Sanski Most they persist longer, in phases 3a-2 and 3b.²⁴ In Glasinac, smooth temple rings of variant D1a are known from grave 1 of tumulus III at Osovo, where they were the only finds, discovered on each side of the woman's head. One terminal tapers to a point, while the other is hammered and twisted into a loop. Their diameter is about 3.8 cm. B. Čović notes that this is a rare form of jewellery in Glasinac and that the grave is probably later than the proposed dating to phase IVc.²⁵ A find of a temple ring of this

shape is also reported from grave 2 of tumulus I at Zagrađe, dated to the Glasinac Vb phase, i.e., after the middle of the 4th century BC, as indicated by the finds of Early La Tène fibulae of the Velika and Zagrađe types in the grave.²⁶

One bronze smooth temple ring of variant D1a comes from a tumulus at Ritešić near Doboј in northern Bosnia. The body is almost doubly twisted and had an inserted decorative bead. One terminal tapers, while the other is hammered and twisted. Finds from the tumulus are dated to the second half of the 5th century BC.²⁷ Similarly to the finds at Sanski Most, a temple

²⁴ Fiala 1899a, 115–116; Čović 1987a, 258, 262, Pl. XXVIII/11; XXIX/8; Tessmann 2001, 94–98, Fig. 67–69.

²⁵ Fiala 1899b, 38–39, Fig. 13; Čović 1987b, 620, fn. 234.

²⁶ Čović 1987b, 633, Pl. LXV/10.

²⁷ Blečić Kavur, Jašarević 2016, 226, Fig. 2: 1. The tumulus contained several buried individuals, one of whom was a woman.

ring of variant D1a served as a bracelet on the right arm of a girl aged 7 to 10 years, buried in grave 9 at the Szentlőrinc cemetery in south-eastern Transdanubia. It is almost doubly twisted, with one terminal tapering and the other hammered and twisted. Its diameter is 4.4 cm, and it is associated with finds from the cemeteries at Donja Dolina and Sanski Most.²⁸

An exception to these finds, all made of copper alloy, would be a small smooth silver temple ring, which may originate from grave 71 at the Luka Postić vineyard in the Dalj–Busija cemetery. This is the eponymous cemetery of the Dalj group, containing cremation graves from the later phase of the Late Bronze Age and Early Iron Age, which also included several inhumation graves from the end of the Early Iron Age and the beginning of the Late Iron Age. The temple ring is made of plain silver wire, hammered and folded at one end, while the other end is damaged. Its diameter is only 1.8 cm. Morphologically, it resembles larger temple rings made of twisted silver or bronze wire. However, its small size aligns it more closely with younger temple rings of twisted silver wire dated to the LT B2 phase, which range between 1.5 and 3 cm in diameter. If the finds indeed belong to a single funerary context, the grave is dated to the 4th century or the beginning of the 3rd century BC.²⁹

Variant D1b: temple rings with a twisted terminal and ribbed on the outside

Temple rings of variant D1b have an externally ribbed, round-sectioned body that ends on one side with a hammered and twisted terminal, while the other terminal tapers to a smooth point. It appears that temple rings from older graves in Donja Dolina (Tab. 2) have only a bent terminal forming a small loop, whereas those from later graves are hammered and twisted. The terminals can be more strongly overlapping, and some are almost doubly twisted (e.g., M. Petrović Jr. graves 12, 44, and 59). The central part of the body can sometimes be smooth, but the temple rings from M. Petrović Jr. grave 59 apparently featured ribbing only in the middle and at the ends. Additionally, some temple rings from M. Petrović Sen. grave 16 featured an entirely ribbed central part, both on the outside and inside. The visibility of narrow and shallow ribbing certainly depends on the preservation of the temple rings.

Temple rings of this shape in Donja Dolina appear as the only type in most graves (Tab. 2). All are inhumation graves, and all but one were likely burials of adult women. In other graves, they occur in combina-

tion with those of variant D1a or of indeterminate form. The number of temple rings per grave ranges from one to as many as ten. They most commonly appear in pairs, but graves M. Petrović Jr. 35 (Fig. 5) and M. Petrović Sen. 16 stand out with five temple rings on each side of the woman's head (Tab. 2). Their diameters range from 2.7 to 7.3 cm, with those from the child's grave M. Petrović Jr. 28 measuring between 2.7 and 3.5 cm.

Two graves belong to the older group of richly furnished graves in Donja Dolina, dated to phases 2a and 2b, or to phases 2 and 3. However, D1b types are most numerous in graves from the later phase 2c or phase 4, which usually do not contain a large number of other finds, except for M. Petrović Jr. grave 35 (Fig. 5). One grave could be attributed to phase 3a (M. Petrović Jr. grave 12) (Tab. 2). Also, a find of this type of temple ring is known from the settlement at Donja Dolina, with a diameter of 3.5 cm,³⁰ while a triple spiral-twisted temple ring with a diameter of 4.3 cm comes from the necropolis as a stray find.³¹ According to Z. Marić, spiral-twisted temple rings with a hammered and twisted terminal are associated with Glasinac,³² regardless of whether the body of the ring is externally grooved or entirely twisted.

Variant D1c: temple rings with a twisted terminal and twisted body

At the Donja Dolina cemetery, one of the more numerous forms is the temple ring of variant D1c, which has a twisted, round-sectioned body. One terminal tapers to a smooth point, while the other is hammered and twisted into a loop. A smooth section is also often found in the central part, similar to variant C3. The terminals can be more strongly overlapping, and some are almost doubly twisted.

Temple rings of this shape in Donja Dolina appear as the only type in all graves (Tab. 2). All are inhumation graves and likely burials of adult women. In the

²⁸ Jerem 1968, 162, 186, Fig. 20/9: 5, Pl. XLI/5. The grave also contained a Certosa fibula of type XIIIc, a Certosa fibula, a bone spindle whorl, glass beads, a bowl, and a cup.

²⁹ Drnić, Rakvin, 2025, 168, Fig. 3/8. Grave 71 contained a large number of glass beads of various shapes, 18 beads made of red coral, a LT B2 fibula, and a chain which also probably belongs to the fibula.

³⁰ Truhelka 1904, 73, Pl. XXXVII/9.

³¹ Marić 1964, 40, Pl. XIV/2.

³² Marić 1964, 41, Pl. XIV/1–2.

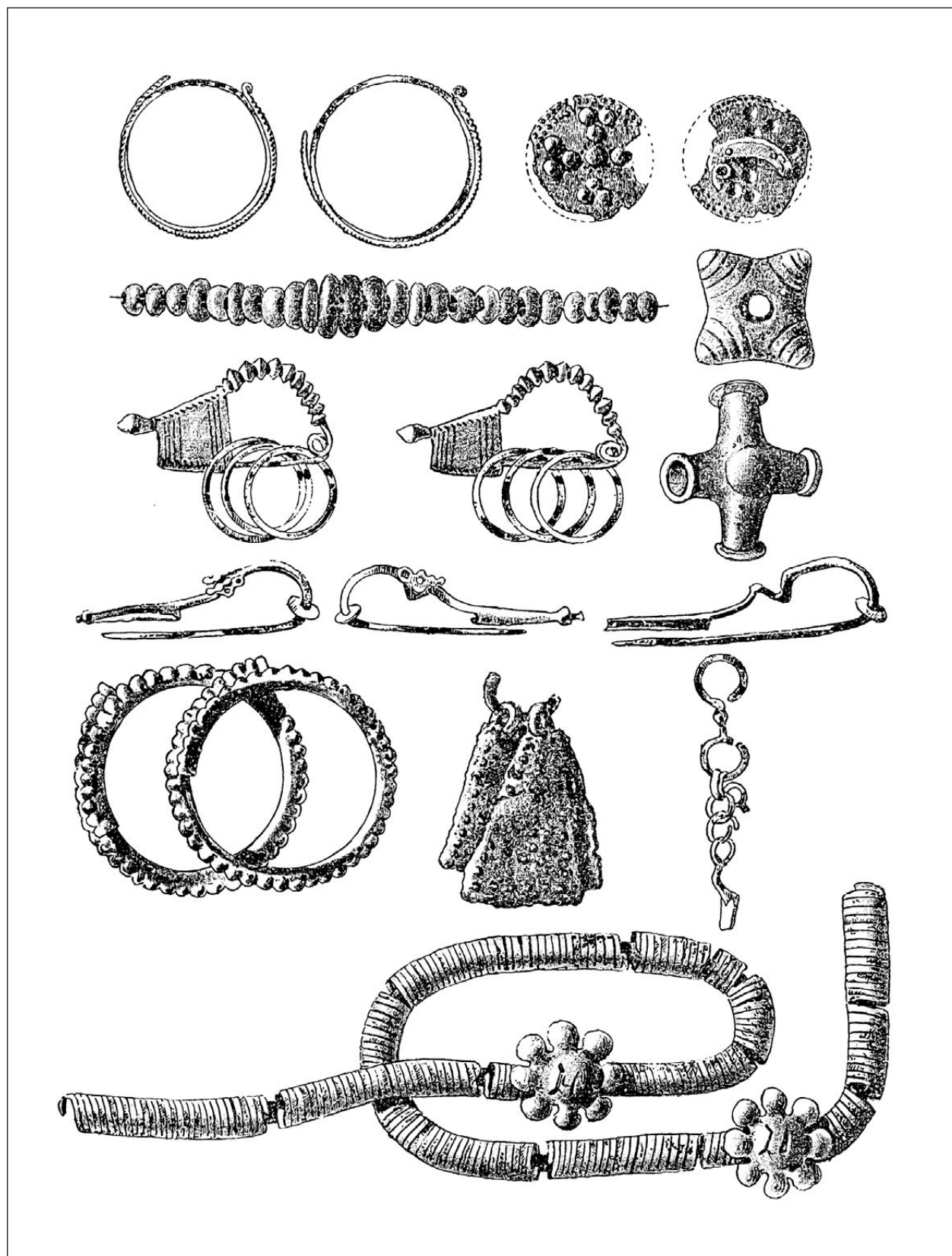


Fig. 5. Grave 35 from the ridge of M. Petrović Jr. at the Donja Dolina cemetery (after: Truhelka 1904)

Сл. 5. Гроб 35 са Грее М. Пејровић мл. на некрополи у Доњој Долини (према: Трухелка 1904)

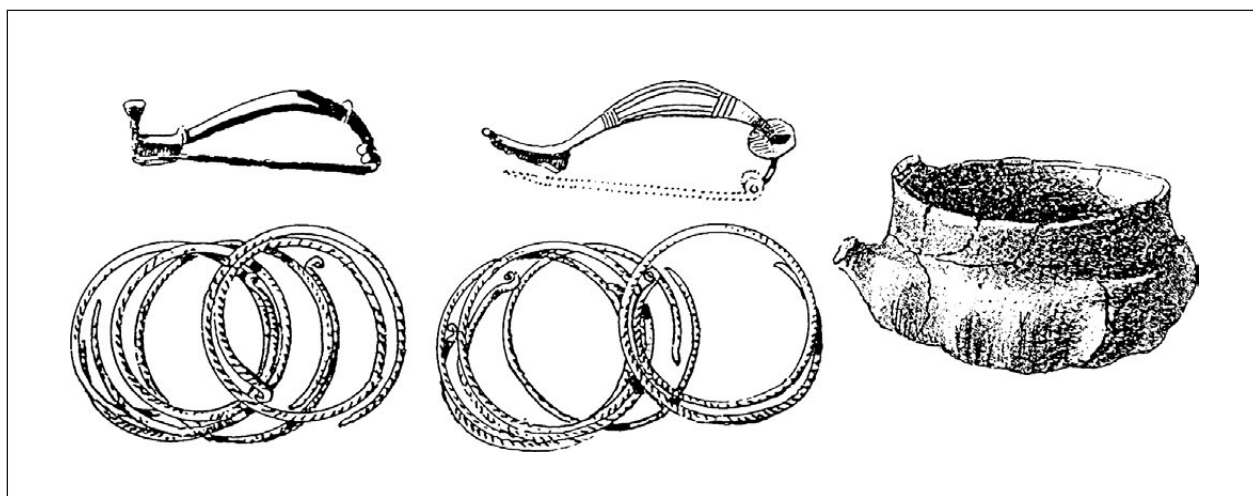


Fig. 6. Grave 9 from the ridge of M. Petrović Jr. at the Donja Dolina cemetery (after: Truhelka 1904)

Сл. 6. Гроб 9 са Грече М. Пејровића мл. на некрополи у Доњој Долини (према: Трухелка 1904)



Fig. 7. Grave 13 from the ridge of N. Šokić I at the Donja Dolina cemetery (after: Truhelka 1904)

Сл. 7. Гроб 13 са Грече Н. Шокића I на некрополи у Доњој Долини (према: Трухелка 1904)

graves, temple rings are found in pairs (Fig. 7), but graves M. Petrović Jr. 9 (Fig. 6) and 30 stand out with four and/or five temple rings on each side of the woman's head (Tab. 2).³³ Their diameters range from 4.2 to 6.0 cm, most commonly around 5.0 cm, with the very thin ones being less than 5.0 cm in diameter. An inter-

esting find is a temple ring of this shape in the child's grave I. Stipančević 7, where it served as a bracelet on

³³ B. Čović considers M. Petrović Jr. grave 9 to be an unreliable context: Čović 1987a, 255.

the right forearm, together with another bracelet. Its diameter is 5.0 cm.³⁴ This find shows that temple rings could sometimes serve a different, likely secondary, function, since they were extremely thin and, as such, not suitable for wearing on the arm. A stray find from the necropolis area is a twisted temple ring with a diameter of 5.5 cm, dated to phase IIc.³⁵

Temple rings of this shape are found in the graves of adult women that do not stand out for having a large number of other costume or jewellery items (Tab. 2). They are present in graves from phases 2c and 3a, or phases 4 and 5. Only M. Petrović Jr. grave 43, due to the presence of fibulae of different dating, can be considered an uncertain grave context; alternatively, the ribbed-bow fibula, as an older item, was later placed in a younger grave. In her analysis of the Donja Dolina cemetery, B. Teržan notes that temple rings with a twisted body appear in graves from the phase marked by the appearance of serpentine fibulae, that is, from the second half of the 6th century BC. Their occurrence is also recorded alongside *certosa* fibulae during the first half of the 5th century BC.³⁶ B. Čović, likewise, dates the appearance of these bronze temple rings to the period from phase 2c through the later phases of 3a and 3b.³⁷

Apart from the cemetery at Donja Dolina, temple rings of variant D1c are currently known from three other sites (Map 1). A richly furnished grave at the Dvorovi–Krčevine cemetery included six bronze temple rings attributed to this variant, some of which appear not to be completely preserved. The temple rings are doubly or triply twisted, with one end hammered and twisted, and are dated to the Donja Dolina 2c phase, corresponding to the last quarter of the 6th century BC. Based on the body ornaments, it is believed that the woman buried in this grave arrived in Semberija from the Donja Dolina group area.³⁸ From the site of Apatin–Mareković Vineyards, likely from a destroyed inhumation grave, comes a bronze temple ring with a twisted, round-sectioned body and more strongly overlapping terminals. One terminal is hammered and twisted into a loop; its diameter is 4.0 cm. The grave included nine glass beads – seven ochre beads and two ochre beads decorated with blue-and-white eye motifs.³⁹ The grave can be dated to the Late Hallstatt period. Noteworthy are the finds of six bronze temple rings with twisted bodies in inhumation grave 8 at the Alsónyék cemetery, where a person over 50 years old was buried. Based on the items of costume (three *Certosa* fibulae, type V) and jewellery, the individual was

likely a woman. Two rings were found near the right side of the head, two between the head and left shoulder, and two more on the left side of the chest area. The terminals are mostly not preserved, but two rings seem to have the preserved beginning of a hammered and twisted loop. Their diameters range from 4.2 to 4.5 cm.⁴⁰

Variant D2: smooth temple rings with twisted terminals

At the Donja Dolina cemetery, one of the less common forms is represented by temple rings with a smooth, round-sectioned body and both terminals twisted into loops. One temple ring of this type, with only slightly overlapping terminals and a diameter of 7.3 cm, was found in the richly furnished grave of an adult woman, M. Petrović Jr. grave 6, where it appeared alongside temple rings of types A1 and B and variant C1. The terminals are not fully preserved, but it seems they were hammered and twisted into loops. The grave is attributed to phase 2b or phase 3. Another possible find of a temple ring of this shape comes from N. Šokić grave 2, that is, one of the two graves from the N. Šokić garden. This is a child's grave; its temple ring appears to have terminals that touch and are hammered and twisted. Since it is a child's grave, Z. Marić suggested it might be a smooth torc with a diameter of 10.5 cm.⁴¹ In any case, this is an exceptional form at the Donja Dolina cemetery, which was not as common as some other types of temple rings.

Variant D3a: silver temple rings with flat terminals and twisted body

Silver temple rings with a twisted, round-sectioned body have been identified as a distinct type (D3). They are divided into two variants, based on the way in which the terminals are formed. Temple rings of

³⁴ Truhelka 1904, 128, Pl. LXXV/3.

³⁵ Marić 1964, 40, Pl. XIV/7.

³⁶ Teržan 1974, 44–45.

³⁷ Čović 1987a, 252, 256, 258, Fig. 16/4; Drnić, Rakvin 2025, 172; Jašarević 2024, 52–54.

³⁸ Jašarević 2024, 51–52, sl. 12; 14, Pl. 3/15. The grave also contained belt plates of an open-work belt with spiral tubes, a plate fibula, arm rings of the Brezje type, amber and glass beads.

³⁹ Lakatoš 2009, 27, Pl. I/7–8.

⁴⁰ Soós 2020a, 57–58, 77–78, Fig. 11; 12/4–10.

⁴¹ Marić 1964, 40, Pl. XIV/17. The grave also reportedly contained a Borajna-type fibula, a double pin, jugs, and a spindle whorl.

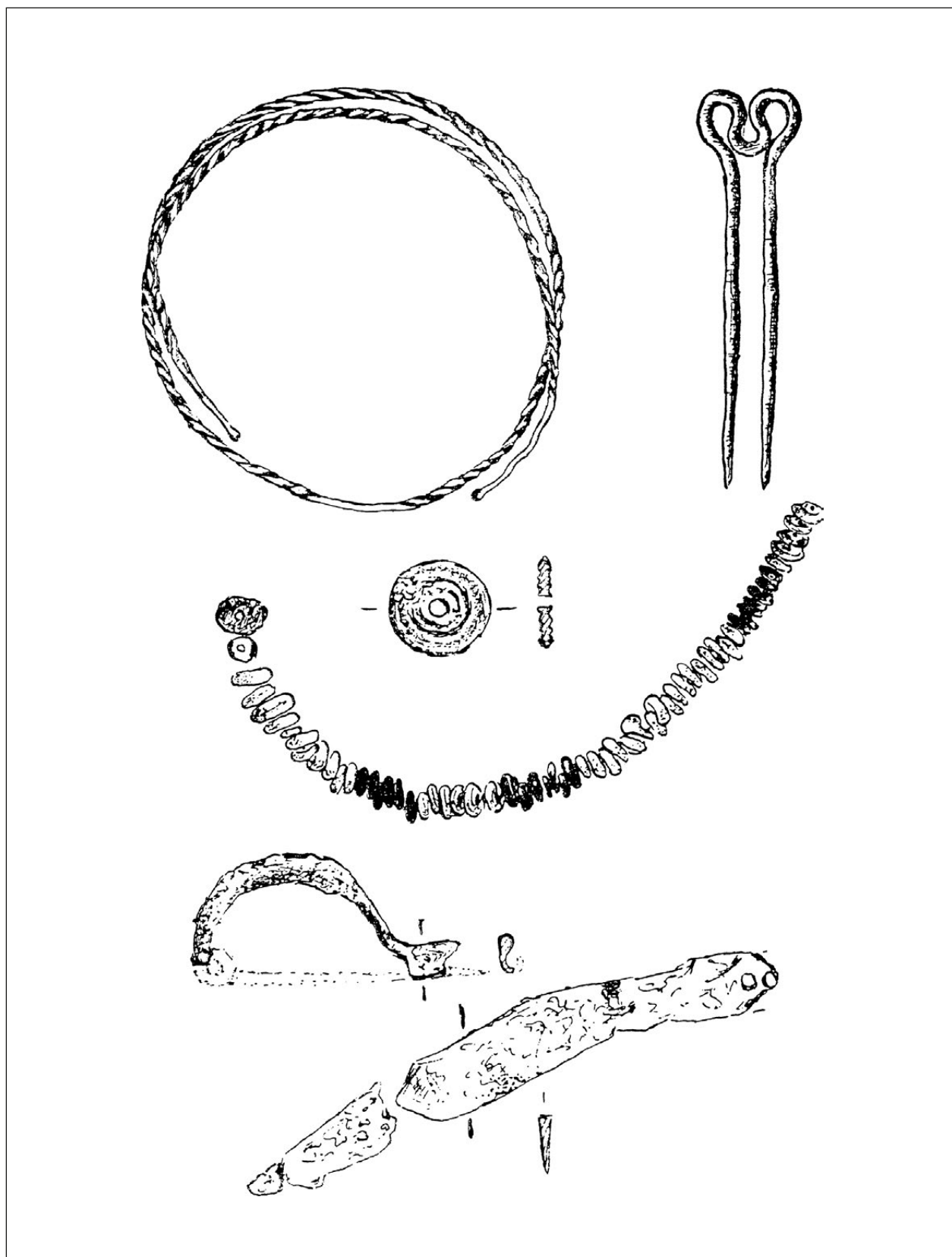


Fig. 8. Grave 1 from the Soline cemetery near Tuzla (after: Jovanović 1957)

Сл. 8. Гроб 1 са некрополе Солине крај Тузле (према: Јовановић 1957)

variant D3a have slightly flared, smooth terminals; they are known only from inhumation grave 1 at the Soline–Srebra cemetery near Tuzla, where several graves were discovered in 1954. In grave 1, one temple ring of this variant was found on each side of the woman's head, both almost doubly twisted (Fig. 8). The terminals are smooth and end with a slight flare, and there is also a smooth section in the central part. Their diameter is 6.5 cm.⁴² Based on the other finds, grave 1 can be dated to the Late Hallstatt period, probably to the end of the 5th and the first half of the 4th century BC. This is the only known find of this variant of silver temple rings. A morphological comparison may be provided by a silver bracelet with a twisted body and smooth, flared ends, found near grave 7 in tumulus I at Čitluci, which may be dated to the Glasinac Vb phase, corresponding to after the middle of the 4th century BC.⁴³

Variant D3b: silver temple rings with a twisted terminal and twisted body

Silver temple rings with a twisted, round-sectioned body have been distinguished as a distinct variant. One terminal is hammered and twisted into a loop, while the other tapers to a smooth point. In the central part of the body, there is also a smooth, undecorated section, as is the case with those made of copper alloy. Temple rings of this variant are doubly twisted. In addition to Donja Dolina, temple rings of this variant have been recorded in the graves of richly equipped women at several other cemeteries, such as Beremend, Velika, Bogdanovci, and Dalj (Map 1).

Silver temple rings of variant D3b, with a very thin body, certainly represent the most frequently analysed form of this type of Late Hallstatt female head/hair jewellery. As already mentioned, B. Čović dated the appearance of bronze temple rings with a twisted body to the period from phase 2c through the later phases 3a and 3b.⁴⁴ Due to finds from Velika and Bogdanovci, D. Božić dated the silver temple rings to the final phase of the Early Iron Age, that is, to the Čurug phase in southeastern Pannonia, which corresponds to LT B1.⁴⁵ These temple rings have only recently been analysed in detail,⁴⁶ so we provide only the basic information about the contexts in which they have been found.

At the Donja Dolina cemetery, one temple ring of this shape was found in the female inhumation grave S. Jakarić 2, which is dated to phase 3b. Its diameter is 3.6 cm. Additionally, finds of four temple rings are reported from the destroyed grave N. Šokić II 9 (Fig. 9).

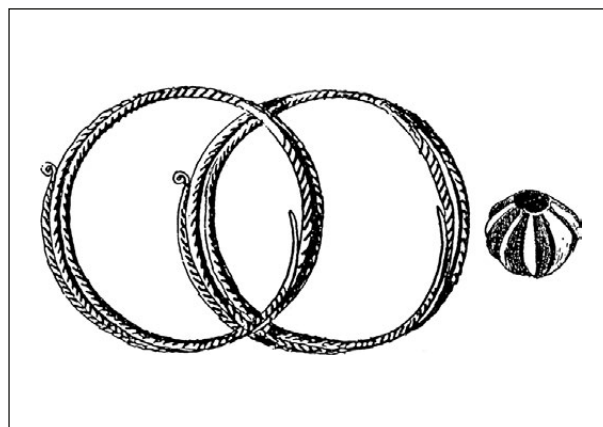


Fig. 9. Grave 9 from the ridge of N. Šokić II at the Donja Dolina cemetery (after: Truhelka 1904)

Сл. 9. Гроб 9 са њреге Н. Шокића II на некрополи у Доњој Долини (према: Трухелка 1904)

One larger and three smaller temple rings have been preserved, all twisted two and a half times. Their diameters are up to 7.0 cm. Z. Marić notes that this does not represent a grave context.⁴⁷ Furthermore, two silver temple rings with twisted bodies are reported from the Donja Dolina cemetery. One is twisted more than twice and has a diameter of 6.5 cm. The other temple ring is twisted one and a half times, with the terminals missing. There is also a known twisted fragment, 10.0 cm in length, which is irregularly bent.⁴⁸ A silver temple

⁴² Jovanović 1957, 245, Pl. I/1. In grave 1, there was also a necklace of 55 different glass beads, three discoid objects, a bronze double pin of type IVa, a poorly preserved iron fibula with a rectangular foot, and an iron knife with a curved blade. The bronze double pin, 3.7 cm long, was found on the woman's chest (Jovanović 1957, 245–246, Pl. I). It belongs to variant IVa, with a smooth M-head, dated from the 8th to the 2nd century BC. It is most widely distributed in the western and southern Balkans, especially during the 5th–4th centuries BC, more often as a male costume item, but it also appears in women's graves (Vasić 1982, 241–250, Map 9; 2003, 123–128, Pl. 69; Blečić Kavur, Miličević-Capek 2011, 34–39, Fig. 3–4; Blečić Kavur, Jašarević 2016, 227–228, Fig. 4; Ognjenović 2019, 363–364).

⁴³ Fiala 1893, 136, Fig. 21; Benac, Čović 1957, 16, 54, Pl. XXXII/11; Čović 1987b, 633. Next to grave 5, four iron spears were also found.

⁴⁴ Čović 1987a, 252, 256, 258, Fig. 16/4.

⁴⁵ Božić 1981, 315, 324.

⁴⁶ Drnić, Rakvin 2025, 170–173, Fig. 6.

⁴⁷ Marić 1964, 19, fn. 51.

⁴⁸ Truhelka 1904, 143.

ring of variant D3b, with a diameter of 4.8 cm, was found in grave 7 in trench B at the Timenačka Greda cemetery,⁴⁹ which likewise belongs to the final phase of the Early Iron Age.

Evidence for the appearance of temple rings of this variant comes from the richly furnished grave 2 in Beremend. It is reported that the adult woman had four silver bracelets with twisted bodies on her right arm, with one terminal hammered and twisted, while the other is smooth and pointed. There is also a smooth, untwisted section on the body. Their diameters range from 4.8 to 5.3 cm. Comparisons are found in Donja Dolina and Glasinac, with the grave dated to the 5th century BC,⁵⁰ or the second half of the 6th century BC.⁵¹ A destroyed grave or graves in Velika, with numerous costume and jewellery items, mostly Early La Tène (LT B1), included three temple rings of variant D3b with diameters of about 6.0 cm, which were thought to be bracelets. The body is made of thin silver wire with narrow and fine coils, with a shorter smooth section in the central part.

Also, the terminal that tapers to a point is smooth, while the other terminal forms a small loop. The completely preserved temple ring is twisted twice. The grave from Velika is dated to the second third of the 4th century BC.⁵² A silver temple ring from Bogdanovci, probably originating from a destroyed rich grave, can be dated to the same period. It is twisted twice and has a diameter of about 6.0 cm.⁵³ Their popularity at the very end of the Early Iron Age is also evidenced by finds from the already mentioned Dalj–Busija cemetery of the Dalj group, where several later inhumation graves were discovered, though the assemblages are not always entirely reliable. One of them, in grave 87 in the Luka Postić vineyard, containing finds from various phases of the Early Iron Age and the beginning of the Late Iron Age, included two temple rings of variant D3b with a diameter of about 4.8 cm. They are made of thin silver wire, with a narrow and finely executed twisted body. There is also a shorter smooth section in the central part. The grave also contained a bronze Early La Tène fibula, three bronze bracelets, as well as glass and coral beads, and one silver bead.⁵⁴

Other finds of late Hallstatt temple rings in the southern carpathian basin

At the Donja Dolina cemetery, several other forms of ring-shaped jewellery were found that could have served as hair ornaments or temple rings. These are

various forms that most often appear together with already defined variants of temple rings; some of these finds show similarities with them, so it is possible that they are actually incompletely preserved parts of already identified types. Thus, in M. Petrović Jr. grave 9, alongside eight temple rings of variant D1c, there was also a smaller round-sectioned bronze temple ring with overlapping terminals, measuring 3.0 cm in diameter. Half of the body is smooth, while the other half is twisted with a smooth terminal. Based on the finds of Certosa fibulae types II and V, the grave belongs to phase 3a-1.⁵⁵ Also, in the older and richly furnished grave M. Petrović Sen. 10 from phase 2a, in addition to five larger temple rings of variants D1a and D1b, there were three smaller bronze temple rings with a smooth, round-sectioned body and slightly overlapping terminals. One terminal tapers to a point, while the other is flat. Their diameters range from 2.2 to 2.9 cm, making them somewhat smaller than the others.⁵⁶

A distinct group consists of temple rings with a twisted body and usually smooth terminals that are only slightly overlapping and have a distinct outline. Thus, in the child's grave M. Petrović Jr. 28 from phase 2c, alongside seven temple rings of variant D1b, there was a small bronze ring with a diameter of only 2.0 cm.⁵⁷ A similar bronze ring or temple ring was found in the cremation grave S. Jakarić 15, also from phase 2c, along with four temple rings of variant D1a. One terminal tapers to a point, while the other is flat

⁴⁹ Arsenijević 2019, 206, cat. no. 1. The grave also contained a Sanski Most type fibula and glass beads.

⁵⁰ Jerem 1973, 68, 72, 81, Fig. 4; 7/2–5, T. XVI/3; 1974, 230; Soós 2020a, 77–78; 2021, 49, Fig. 1A; 2020b, 411–412, Fig. 3B. The grave also contained two silver fibulae of the Novi Pazar type, three bronze Certosa fibulae of type V, two fittings of an open-work belt with spiral tubes, a sceptre, glass beads, a spindle whorl, a bronze tube-shaped plate, a knife, and an iron nail.

⁵¹ Metzner-Nebelsick 2002, 418, Fig. 187/11–13, 16.

⁵² Sokač-Štimac 1984, 130, Fig. 2; Majnarić-Pandžić 1996, 36, Fig. 2; Dizdar, Potrebić 2002, 113–114, Pl. 2/1, 3; 3/1. Given the number of finds, they probably come from at least two destroyed graves.

⁵³ Brunšmid 1909, 232–233 Fig. 23/5.

⁵⁴ Drnić, Rakvin 2025, 170, Fig. 5/8–9.

⁵⁵ Truhelka 1904, 92; Čović 1961, Y28; Marić 1964, 43; Gavranović 2007, 413; 2011b, 131.

⁵⁶ Truhelka 1904, 125, Pl. LXXII/11, 14; Čović 1961, Y21/15–17; Gavranović 2011b, 128, Fig. 157/11.

⁵⁷ Truhelka 1904, 96.

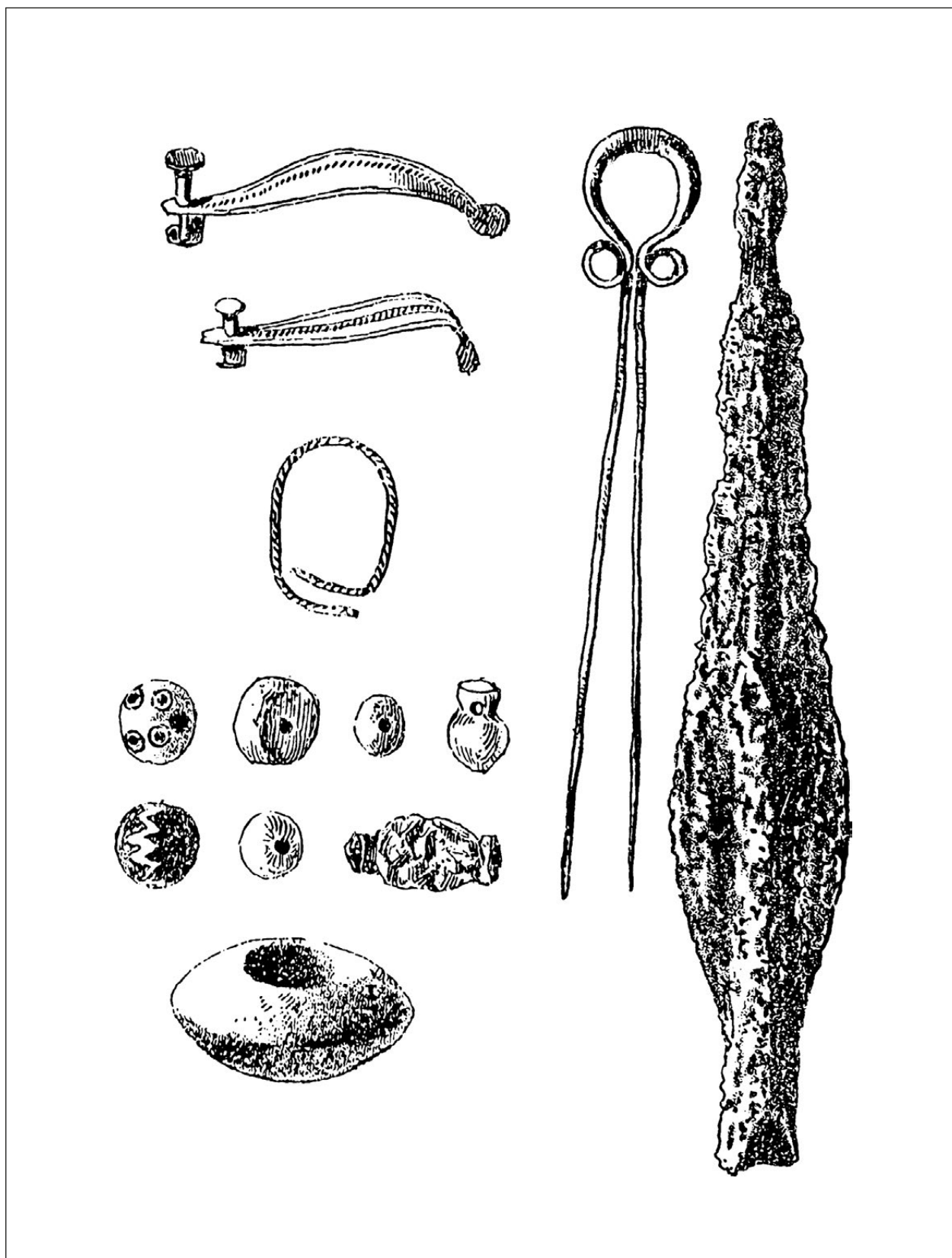


Fig. 10. Grave 13 from the ridge of M. Petrović Jr. at the Donja Dolina cemetery (after: Truhelka 1904)

Сл. 10. Гроб 13 са Грече М. Пејровића мл. на некрополи у Доњој Долини (према: Трухелка 1904)

with a diameter of 3.8 cm.⁵⁸ This group could include a small silver ring from the destroyed grave M. Petrović Jr. 13. It is made of thin silver wire with narrow and fine coils, and has a diameter of 3.0 cm (Fig. 10). The overlapping terminals have not been preserved. Based on the other finds, the grave would belong to the youngest phase 3b.⁵⁹

These finds show similarities with certain temple rings of the Vekerzug culture, which A. Kozubová divided into three main groups – spiral, serpentine, and round-oval. The Vekerzug culture is characterized by serpentine temple rings, with three types appearing from the first half of the 6th century BC.⁶⁰ It should be emphasized that hair ornaments were most often worn by adult women, and the occurrence of these items alongside other body adornments allows for the identification of several types of female costume, testifying to different aspects of the social identities of women.⁶¹

Finds from Donja Dolina correspond to round-oval temple rings, which are most often made of copper alloy, though there are also silver, electrum, and iron rings; they are small in diameter, ranging from 1.5 to 2.0 cm. Based on the shape of the body, they are divided into two main types, while the variants are recognized by the ends: type I has a plain, smooth body, while type II has a twisted body. Type I rings are divided into two variants, having a round or oval-shaped body, while the cross-section can vary. The terminals are rounded, pointed, or smoothly cut, and sometimes decorated with grooves.⁶² Type II temple rings are rarer and also have two variants: II1 with terminals that touch, which can be rounded or flat, and II2 with overlapping terminals. The latter variant, II2, most closely resembles the rings from Donja Dolina.⁶³ Temple rings of this group are not precisely dated, as they are found in graves with few other finds. Their origin is not yet fully defined; it may be in the west, where they appear earlier (Ha C2/D1). At the Chotín cemetery, round-oval temple rings have been recorded in two graves with adult men and in three with children. They were worn singly or in pairs, and it is not excluded that they could also have been worn as earrings.⁶⁴

In addition to these finds from Donja Dolina, there is another link with the Vekerzug culture: the large bronze serpentine temple ring from Novi Jankovci near Vinkovci, which is currently a unique find. This temple ring belongs to type I, which is found throughout the distribution area of the Vekerzug culture, and

Novi Jankovci is currently the southernmost site of this type.⁶⁵

The Donja Dolina cemetery includes two other interesting forms of ring-shaped jewellery, which could also have served as hair ornaments or temple rings. The recently analysed cremation grave I. Stipančević 16,⁶⁶ containing an urn with the cremated remains of a girl along with numerous costume and jewellery items, is reported to have included two small spiral-twisted and strap-sectioned bronze bracelets with tapering terminals. Their diameter is 3.6 cm.⁶⁷ Given the discovery of four bronze bracelets, the question arises as to whether these spiral rings are truly bracelets or if they were actually hair ornaments. Comparable finds have been recorded in Lower Carniola, where similar items have been defined as earrings of type 3, which are most common during the horizon of serpentine fibulae.⁶⁸ Based on the finds of two bronze crested fibulae and a bronze double-loop fibula with a rectangular foot featuring two holes, the grave is dated

⁵⁸ Truhelka 1904, 108; Čović 1987a, 252; Gavranović 2011b, 139.

⁵⁹ Truhelka 1904, 93, Pl. XLIV/24; Marić 1964, 46, Pl. XXVI/27; Gavranović 2007, 414, Fig. 13/3.

⁶⁰ Hair jewellery of the Vekerzug culture has often been analysed, with the latest and most detailed classification by A. Kozubová: 2013, 26–34; 2018, 13–55, Fig. 10; 2019, 106–109, Fig. 28; 31.

⁶¹ Kozubová 2018, 13, 39–55; 2019, 146–149.

⁶² Kozubová 2018, 16; 2019: 107–108. Variant I1: smooth with touching terminals (Fig. 13/15–16; 14/5–7); variant I2: with slightly or more strongly overlapping terminals (Fig. 11/1, 3, 5, 7–8, 12, 14; 14: 20).

⁶³ Kozubová 2018, 16; 2019: 107–108. Variant II1 (Fig. 13/2; 14/1–3) and variant II2 (Fig. 14/9). At Vekerzug culture cemeteries in eastern Hungary, temple rings with twisted bodies appear in the 6th century BC and continued to be worn during the first half of the 5th century BC. Some examples of temple rings with twisted bodies and various types of terminals, most often with a small conical expansion, are from the Szentes – Vekerzug cemetery: Párducz 1954, 52, 64, Pl. VI/12; XIII/17–18; XVII/8–9; XXIV/1; Kemenczei 2009, 80–81.

⁶⁴ Kozubová 2018, 32–33, 40, 44; 2019, 107–108, 149. At the Hallstatt cemetery, dated to the second half of the 7th century BC.

⁶⁵ Dizdar 2023, 140–142, Fig. 2.

⁶⁶ Dizdar, Potrebica 2021.

⁶⁷ Truhelka 1904, 132, Pl. LXXVI/19; Čović 1961, Y24/6–7; Marić 1964, 43, Pl. XXVI/20; Gavranović 2011a, 212; 2011b, 130, Fig. 162/6–7. A similar bracelet with a diameter of 4.0 cm was found in Donja Dolina, outside the grave context (Truhelka 1904, 46, Pl. LXXXI/18).

⁶⁸ Dizdar, Potrebica 2021, 11–12, Fig. 1.

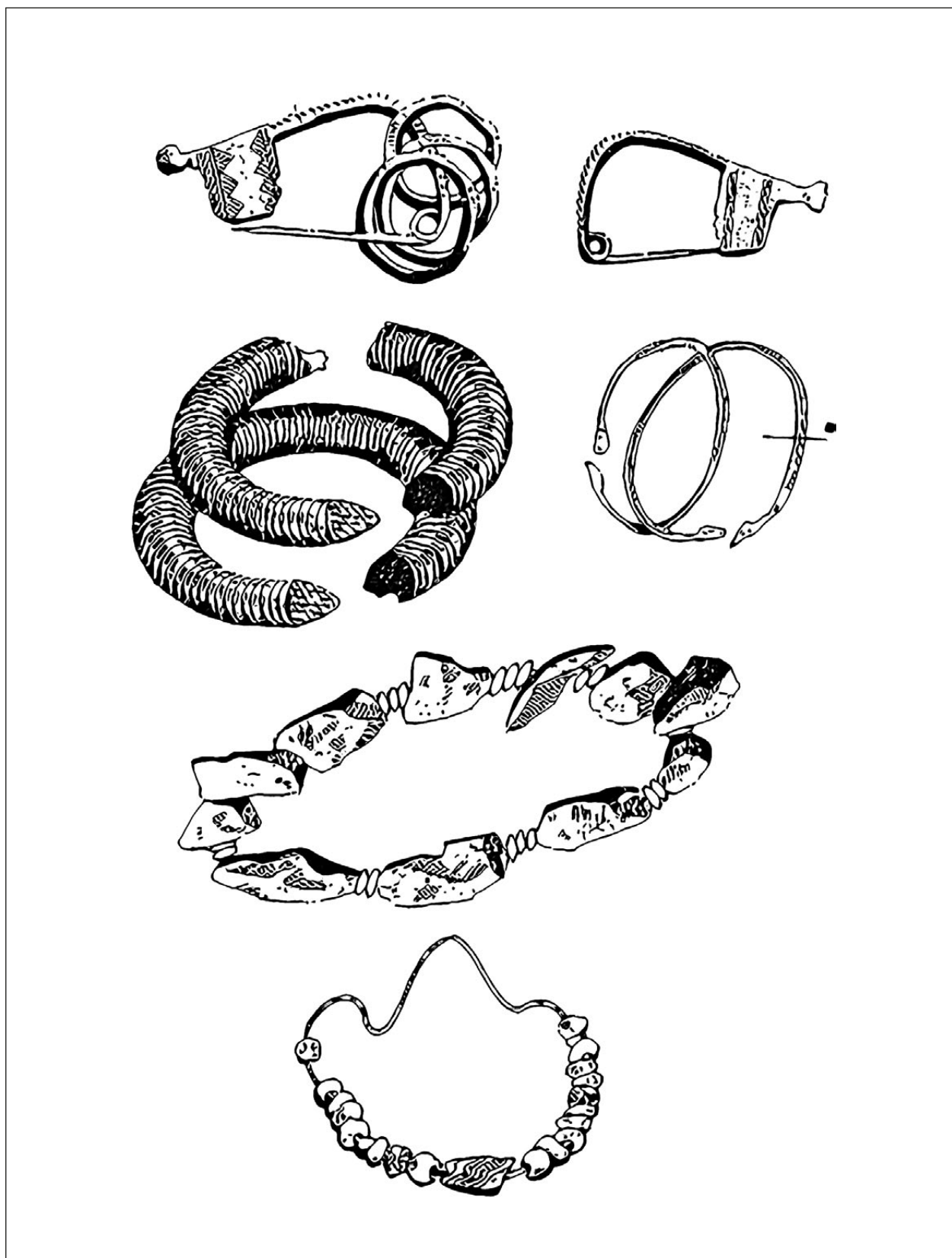


Fig. 11. Grave from the Šabac–Jela cemetery (after: Vasiljević 1977)

Сл. 11. Гроб са некрополе Шабач-Јела (према: Васиљевић 1977)

to phase 2c, corresponding to around the middle of the 6th century BC. Interestingly, the fibula finds indicate connections with Glasinac, while the two temple rings or earrings suggest links with Lower Carniola.

Two bronze temple rings found in grave S. Jakarić 16 were the only finds accompanying the woman, who was placed in a contracted position. They are made of double thin wire and were twisted two and a half times into a spiral. One terminal is soldered and ends in a point, while the other ends in a loop; their diameter is 2.7–3.0 cm.⁶⁹ According to Z. Marić, these temple rings indicate a connection between Donja Dolina and Lower Carniola.⁷⁰

The temple rings from grave S. Jakarić 16 can be attributed to type 2, which is characterized by being made of bronze wire with a round cross-section. They are crafted from double wire with a loop at one end, and are sometimes decorated by twisting or with so-called false twisted ornamentation. They are rare at Magdalenska Gora – only two examples are known – but are more common at other sites in Lower Carniola. They are dated to the Stična 2 and the serpentine fibula phases, and their production is considered to have had a long tradition.⁷¹

Two silver temple rings, described as earrings, were found in the inhumation grave of a woman aged 25–30 years at the Šabac–Jela site. The temple rings were discovered next to the woman's head. They have a rhombic cross-section, with hammered semi-circular and triangular terminals that are slightly apart or overlapping (Fig. 11). Their diameters are 5.2 and 5.4 cm,⁷² and for now, however, they have no direct parallels. Also found in the grave were two fibulae of the younger variant of the Arareva gromila type; the arms were decorated with hollow ribbed bracelets of the Brezje type with indented terminals, one of which ends with incised net motifs; the neck was decorated with two necklaces made of amber and glass beads.⁷³ R. Vasić dates the grave, based on the fibulae – which he considers to be a younger variant with a ribbed bow – to horizon 3 of the Early Iron Age or the beginning of horizon 4.⁷⁴ M. Dizdar notes that the grave likely dates from the end of the 6th century and the first half of the 5th century BC.⁷⁵ The fibulae belong to the younger variant of the Arareva gromila type,⁷⁶ while the bracelets have parallels in Lower Carniola, where they are classified as the Brezje type or variant V4, dated from the end of the Stična 2 phase, appearing in the horizon of serpentine fibulae and most commonly in the horizon of Certosa fibulae.⁷⁷

COSTUME AND JEWELLERY ITEMS IN GRAVES WITH TEMPLE RINGS OF TYPES C AND D

A key component for the chronological definition of temple rings of types C and D with their variants is the typological-chronological analysis of other costume and jewellery items from the grave contexts in which they appear, primarily referring to the cemetery in Donja Dolina (Tab. 1–3). This analysis will also include these items from graves at other sites where temple rings of types C and D have been recorded. The results of the diachronic analysis can testify to different aspects of female social identities during the Late Hallstatt period in the southern Carpathian Basin, and about established cultural connectivity between neighbouring and even distant regions. Since certain variants of temple rings of types C and D in Donja Dolina appear in the same grave contexts as those of types A and B – especially temple rings of variant C1⁷⁸ – we will not list again the already analysed costume and jewellery items, nor will we highlight supraregional forms of women's costume and jewellery. In fact, the cemetery in Donja Dolina stands out by virtue of its integration of forms of diverse origin within the same grave context, resulting in unique hybrid combinations that were important for expressing women's visual identity. The result is a unique female body decoration whose visual code corresponds to the community that created it.⁷⁹

⁶⁹ Truhelka 1904, 108, Pl. LVI/12; Marić 1964, 40, Pl. XIV/4.

⁷⁰ Marić 1964, 41.

⁷¹ Tecco Hvala 2007, 478–479, 486, Fig. 1; 9; 2012, 328, Fig. 122.

⁷² Vasiljević 1977, 167, 169, Fig. 2/5; Jašarević 2024, 37, Fig. 4/3–4.

⁷³ Vasiljević 1977, 167, 169, Fig. 2/1–7. The grave was dated to around 450 BC.

⁷⁴ Vasić 1977, 24, 26, Pl. 52/1–6; Jašarević 2024, 37, Fig. 4.

⁷⁵ Dizdar 2020, 203, 206, Fig. 14.

⁷⁶ More on these fibulae can be found in the section of the article on costume items.

⁷⁷ Parzinger 1995, 29–32, 263–264, Fig. 12; Tecco Hvala 2012, 316, 320, Fig. 116/2; Jašarević 2024, 35–38. Also, an arm ring of this shape in Donja Dolina was dated to phase IIc (Truhelka 1904, 73, Pl. XXXVII/3; Marić 1964, 41, Pl. XIV/14); in a woman's grave in the Dvorovi–Krčevine cemetery (Jašarević 2024, 35, Pl. 3/16).

⁷⁸ Dizdar, Kapuran 2021, Tab. 1; 3.

⁷⁹ Dizdar, Kapuran 2021, 177–197, Tab. 4–5.

The analysis will be facilitated by the realization that different variants of temple rings of types C and D sometimes occur within the same grave contexts in Donja Dolina, that is, the same items of costume and jewellery appear in graves with different forms of temple rings (Tab. 3). The joint occurrence of different forms would indicate the same or a closely related time frame of their use (Fig. 13). Other sites with certain variants of temple rings often have the same costume and jewellery items as in Donja Dolina, which further facilitates the dating of graves.

Costume items include various forms of belt sets, belts, buckles, and fibulae, while jewellery includes finds of torcs and bracelets (Tab. 3). Other jewellery items, such as different types of pendants and beads, have not been specifically analysed on this occasion.⁸⁰ Among the belt sets and buckles that have not been previously analysed, the graves in Donja Dolina, as well as other sites with temple rings of types C and D, have yielded sets with a rosette-shaped buckle and spiral tubes, astragal belts,⁸¹ buckles with ribs and protrusions, and cross-shaped buckles (Tab. 3). Among the fibulae, in addition to those already analysed, a large number of different forms with variants have been identified (Tab. 3): serpentine fibulae, *a tre bottoni* fibulae, fibulae with a ribbed bow, fibulae of the Rusanovići and Arareva gromila types, fibulae of the Novi Pazar type, fibulae with a strap bow, and various types of Certosa fibulae, while the latest finds are various forms of Early La Tène (LT B1) fibulae, among which fibulae of the Sanski Most type are also listed. Among the jewellery for the typological-chronological analysis of temple rings, in addition to the already analysed forms, finds of bracelets with a ribbed body are important.

Belt sets with a rosette-shaped buckle and tubes

In women's graves at the cemetery in Donja Dolina, various forms of temple rings – especially types A, B, and C1 (Tab. 3) – are accompanied by belt sets composed of diverse forms of buckles and buttons. These indicate cultural connectivity with the Glasinac region; at the Donja Dolina cemetery, they have been found in graves dated to the second half of the 7th and the beginning of the 6th century BC.⁸² A somewhat later form of these belt sets, with a longer period of use – although those in grave M. Petrović Sen. 9 appear together with the older ones – are most often composed of two or three rosette-shaped buckles with a

domed central part and a bar on the underside. Spiral tubes were also an integral part of the set. These belt sets with two buckles were found with temple rings of variant D1b in graves M. Petrović Jr. 35 (Fig. 5) and M. Petrović Jr. 59.⁸³ Sets with rosette-shaped buckles and spiral tubes were found in two other older graves in Donja Dolina,⁸⁴ while another older grave, N. Šokić II 4, containing temple rings of types A1 and C1, included a rosette-shaped buckle accompanied by two open-work fittings.⁸⁵ In yet another destroyed grave, a single buckle was found.⁸⁶ Of particular interest is the find of the belt set in the mentioned grave M. Petrović Sen. 9, dated to phase 2b, corresponding to the late 7th century BC,⁸⁷ where it was found together with two other belt sets with different buckles and with single and double domed buttons with radial slits. Three rosette-shaped buckles, and a large number of spiral tubes, were located from the shoulder to the waist of the woman, which might indicate that it was an ornament for the upper part of the body⁸⁸ or a set that was symbolically placed in the grave.

Rosette-shaped buckles with a bar on the underside are considered by B. Čović to be a form that appears during phase 2b (late 7th and early 6th centuries BC).⁸⁹ However, they continued to be worn during phase 2c, which is the dating of graves M. Petrović Jr. 35 and 59.⁹⁰ Their origin is traced to the regions of Greece

⁸⁰ For various pendants and beads in Donja Dolina, see: Gavranović 2011a, 233–240.

⁸¹ Late Hallstatt astragal belts have been analysed several times in recent years: Filipović, Mladenović 2017; Dizdar, Tonc 2018; Dizdar 2019, 330–337; 2020, 199–207; Soós 2020a, 69–70; 2021, 52–54; 2022, 186–188.

⁸² Dizdar, Kapuran 2021, 179–181, Tab. 5.

⁸³ Grave M. Petrović Jr. 35: Truhelka 1904, 98, Pl. XLVIII/19; Marić 1964, Pl. XIV/15; Čović 1961, Y27/144–145; Gavranović 2011a, 233, Fig. 236/2; 2011b, 131, Fig. 143/144–145. Grave M. Petrović Jr. 59: Truhelka 1904, 105, Pl. LIII/21–22, 24.

⁸⁴ Grave N. Šokić I 1: Truhelka 1904, 111, Pl. LVIII/14, 22, 25–26; Čović 1987a, 248, Pl. XXVI/9. The domes of the clasps are decorated with a rhombus motif. Grave M. Petrović Sen. 9: Truhelka 1904, 124–125, Pl. LXXI/2, 4–5; Gavranović 2011a, 233, Fig. 236/1; 2011b, 137, Fig. 174/18; Dizdar, Kapuran 2021, 180, Fig. 7/13.

⁸⁵ Truhelka 1904, 133, Pl. LXXVII/20; Dizdar, Kapuran 2021, 180, Fig. 9/8.

⁸⁶ Grave M. Petrović Sen. 20: Truhelka 1904, 127, Pl. LIII/3; Marić 1964, Pl. XIV/20.

⁸⁷ Čović 1987a, 248; Gavranović 2011a, 223, 239, Fig. 224/1.

⁸⁸ Gavranović 2011a, 233, Fig. 236.

⁸⁹ Čović 1987a, 246, Pl. XXVI/9.

⁹⁰ Čović 1987a, 252–253, Pl. XXVI/9; Gavranović 2011a, 233.

Grave	Temple rings															
M. Petrović 2	A C1	x														
M. Petrović 3	A C1		x													
M. Petrović Sen. 4	A C1			x												
M. Petrović Jr. 3	A B C1		x													
M. Petrović Jr. 6	A B C1 D2	x														
N. Šokić II 5	D1a			x												
M. Petrović Sen. 16	D1b		x													
I. Stipančević 14	C1 C2															
M. Petrović Jr. 31	C1 C2 D1a															
M. Petrović Jr. 62a	C1															
S. Jakarić 15	D1a															
M. Petrović Jr. 28	D1b															
M. Petrović Jr. 35	D1b			x												
M. Petrović Jr. 34	D1c															
M. Petrović Jr. 12	D1b															
N. Šokić I 26	D1c		x													
M. Petrović Jr. 9	D1c															
M. Petrović Jr. 43	D1c															
Timenačka Greda 7	D3b															

Tab. 3. Types of costume and jewellery found in graves in Donja Dolina alongside temple rings of types C and D (made by: M. Dizdar and A. Kapuran)

Таб. 3. Типови предметна ношње и накита у гробовима у Доњој Долини са слепоочничаркама типова C и D (направили: М. Диздар и А. Капуран)

and North Macedonia, where they were numerous during the 7th and 6th centuries BC,⁹¹ while at sites in Bulgaria they are also dated to the 7th century BC.⁹²

In conclusion, sets composed of rosette-shaped buckles and spiral tubes – regardless of whether they were part of a belt or an ornament for the upper part of the body – indicate contacts with the southern Balkan region. In Donja Dolina, they represent a characteristic item of women's costume from the end of the 7th century to nearly the end of the 6th century BC.

Belt buckles

Belt buckle with ribs and protrusions

The richly furnished inhumation grave M. Petrović Sen. 16 included temple rings of variant D1b together with a round, domed belt buckle, featuring three horizontal ribs in the central part and smaller protrusions along the edge. On each side, in the central section, there is a longer protrusion bent at the ends. The grave also contained 87 small domed buttons with a small loop on the inner side,⁹³ so the buckle was probably part of a belt set together with the buttons. The grave is dated to the beginning of the 6th century BC, corresponding to phase 2b, based on the finds of a plate fibula and a boat-shaped fibula with a long foot.⁹⁴ Buckles of this type have been found in two other graves in Donja Dolina, in both male and female burials. In the cremation grave N. Šokić I 9, beneath the urn, there was a buckle with three ribs and small round protrusions along the edge.⁹⁵ Another buckle, with two ribs and round protrusions along the edge, was found in the warrior cremation grave I. Stipančević 10 from phase 2b.⁹⁶ Near the destroyed grave S. Jakarić 20, a buckle was found with small triangular protrusions along the edge and, on the inner side, a row of round holes.⁹⁷ Two buckles of this type were stray finds from the necropolis.⁹⁸

Round domed belt buckles with two or three horizontal ribs on the central part and protrusions along the edge, which likely originate from the Glasinac area where they are particularly numerous,⁹⁹ have been classified as type 7, variant 1, and are recorded in both male and female graves.¹⁰⁰ They are dated to phase 2b in Donja Dolina but also appear during phase 2c.¹⁰¹ These buckles are especially common in Glasinac and are considered characteristic of phase IVc-2, though they still occur at the beginning of phase Va.¹⁰² Their appearance at the start of phase Va is attested by grave 5 of tumulus III in Vražići, which contains a Certosa

fibula of type V and a fibula of the Arareva gromila type.¹⁰³ M. Gavranović shares a similar view, dating these round domed buckles with two or three ribs and protrusions in Glasinac to the late 7th century BC, corresponding to phase IVc-2. In Donja Dolina, they are dated to the 6th century BC and, besides Glasinac, they have been found at sites in Herzegovina and western Serbia,¹⁰⁴ with the southernmost example currently documented at the Shtoj cemetery in northern Albania.¹⁰⁵ A notable stray find of this buckle type with bead-like expansions along the edge comes from the Vekerzug culture cemetery at Muhi-Kocsmadomb in the Tisza valley, and is highlighted as evidence of contacts with the northern Balkans and Donja Dolina.¹⁰⁶

In conclusion, round domed belt buckles with horizontal ribs and protrusions in Donja Dolina are part of both women's and men's costume, and are dated from the beginning and throughout the 6th century BC. They also indicate cultural connectivity with the Glasinac area.

⁹¹ Kilian 1975, 84, 109, Pl. 90/2.

⁹² Gergova 1987, 60, Pl. 22/A17–A20.

⁹³ Truhelka 1904, 126, Pl. LXXIII/17; Čović 1961, Y23/100; Čović 1987a, 248, Pl. XXVI/8; Gavranović 2011a, 224, Fig. 226/3; 2011b, 129, Fig. 160/100.

⁹⁴ Gavranović 2011a, 194, 224; 2011b, 129.

⁹⁵ Truhelka 1904, 113, Pl. LXI/4–5.

⁹⁶ Truhelka 1904, 129, Pl. LXXV/16; Marić 1964, Pl. XIV/19.

⁹⁷ Truhelka 1904, 109, Pl. LVII/18. A similar serrated edge is found on a clasp from the Pod settlement (Gavranović 2011a, 224, Fig. 226/2).

⁹⁸ Marić 1964, Pl. XIV/18, 21.

⁹⁹ Lucentini 1981, 83, Fig. 4/14.

¹⁰⁰ Tessmann 2004, 146, 153–154, Fig. 19.

¹⁰¹ Čović 1987a, 246, 250, 253.

¹⁰² Čović 1987b, 619, 621–622, Pl. LXII/ 8, 29; Tessmann 2004, 153–154. B. Čović (1987b, 621–622) distinguishes two basic forms: those with a flat, undecorated edge, which are rarer, and those with an edge decorated with stick-like protrusions with expansions or bead-like round protrusions along the edge. Clasps of the second form are significantly more numerous.

¹⁰³ Teržan 1976, 376–377, Fig. 46/5.

¹⁰⁴ Gavranović 2011a, 224, Fig. 226, Map 65.

¹⁰⁵ Koka 1990, 36, 57, Pl. VI/70. Grave 13 of tumulus VI corresponds to the Glasinac IVc-2 phase.

¹⁰⁶ Kemenczei 2009, 85, 128, Pl. 42/4; Kozubová 2019, 125. Belt sets are not characteristic of the Vekerzug culture.

Cross-shaped buckle (separator)

The aforementioned richly furnished grave M. Petrović Jr. 35 included temple rings of variant D1b alongside a belt set composed of two rosette-shaped buckles and spiral tubes, but also a cross-shaped buckle, which was found to the right of the pelvis. This buckle features a round protrusion in the central part on the front, while each end of the cross-shaped extensions has a ring-like expansion (Fig. 5).¹⁰⁷ The same type of buckle was found in the same position next to the deceased in the richly furnished warrior grave M. Petrović Jr. 37.¹⁰⁸ Another cross-shaped buckle is reported as the only find in grave M. Petrović Jr. 20,¹⁰⁹ and a stray find of such a buckle is also known from the cemetery.¹¹⁰ Finds from the two mentioned graves show that cross-shaped buckles were part of both women's and men's costume. Finds in men's graves in Glasinac are also interpreted as parts of horse equipment.¹¹¹

B. Čović dates cross-shaped buckles, which he refers to as cross-shaped separators, to phases 2b and 2c.¹¹² M. Gavranović emphasizes that this is a widespread and long-period form of buckle or separator. He dates grave M. Petrović Jr. 37 to the late 7th century BC, while he considers that grave M. Petrović Jr. 35 is not older than the mid-6th century BC.¹¹³ In Glasinac, these buckles are dated to phase IVc-2.¹¹⁴ Examples of this buckle type at sites in the Vardar valley are dated earlier. The cross-shaped buckle from grave 25 at the Suva Reka cemetery is roughly dated to the 7th century and the first half of the 6th century BC.¹¹⁵ At the Dedeli cemetery, where they are also women's costume items, two buckles in grave 34 were found in the abdominal area of the woman, indicating how they were worn.¹¹⁶ This is also confirmed by the finds of four cross-shaped buckles – three like those from Donja Dolina and one of a somewhat different form – in the abdominal area of the richly equipped young woman from grave 7, tumulus 2, at the Kaluđersko Polje cemetery near Priboj, dated to the end of Glasinac phase IVc-1 and the beginning of phase IVc-2.¹¹⁷ The grave can be dated to the first half of the 6th century BC, based on finds of a crest-shaped fibula of the Zabrnjica type, two bronze spectacle fibulae without figure-of-eight loops, a double-loop fibula with a foot in the shape of a Boeotian shield, two double pins of type IIIa, and numerous other costume and jewellery items.¹¹⁸

In conclusion, cross-shaped buckles in Donja Dolina, where they are part of both women's and men's costume, are dated from the end of the 7th and into the 6th century BC. This is a widespread form that also

indicates cultural connectivity with the Glasinac area and the southern Balkans.

Serpentine fibulae

The numerous variants of temple rings of types C and D in Donja Dolina are dated on the basis of various forms of fibulae, among which serpentine fibulae are the most numerous. Notably, some graves contain combinations of different forms of temple rings (Tab. 3). The majority of serpentine fibulae are of the same type, characterized by a plate or disc at the junction of the saddle-shaped bow and the pin, as well as a long foot, which may have a globular expansion at the end (variant IVb). The graves usually contain single serpentine fibulae of this variant (Fig. 3), except for grave M. Petrović Jr. 34, which contains three fibulae.¹¹⁹ M. Petrović Jr. 62a was the only grave containing a fibula without a plate (Fig. 2); in fact, this fibula had been repaired, as the junction of the bow and the pin was connected with two rivets (possibly variant IVa).¹²⁰ M. Petrović Jr. 35 was the only grave containing a fibula of variant IVb alongside two other serpentine fibulae with wings, variant Va (Fig. 5). Serpentine fibulae of variant IVb have been found in two other graves in

¹⁰⁷ Truhelka 1904, 98, Pl. XLVIII/14; Čović 1961, Y27/17; Čović 1987a, 252, Pl. XXVIII/3; Gavranović 2011a, 240, Fig. 248/2; 2011b, 131, Fig. 163/17.

¹⁰⁸ Truhelka 1904, 100, Pl. XLIX/12; Gavranović 2011a, 240, Fig. 248/1; 2011b, 136, Fig. 170/12.

¹⁰⁹ Truhelka 1904, 93, Pl. XLIV/26; Marić 1964, Pl. XV/20. Z. Marić (1964, 19, fn. 51) states that this is not a grave.

¹¹⁰ Truhelka 1904, 150, Fig. 99, Pl. LXXXI/44.

¹¹¹ Čović 1987b, 622–623. On this method of using cross-shaped separators: Metzner-Nebelsick 2002, 355–357.

¹¹² Čović 1987a, 248, 253.

¹¹³ Gavranović 2011a, 240.

¹¹⁴ Čović 1987b, 622–623.

¹¹⁵ Vasić 1987c, 704, Pl. LXXII/7.

¹¹⁶ Mitrevski 1991, 26, 56–57, Pl. X/6; XVIII/12.

¹¹⁷ Derikonjić 2010, 12.

¹¹⁸ Dizdar, Potrebica 2021, 30–31.

¹¹⁹ Child grave M. Petrović Jr. 28: Truhelka 1904, 96, Pl. XLV/19. Grave M. Petrović Jr. 31: Truhelka 1904, 97 Pl. XLVI/15; Čović 1987a, 252, Pl. XXVII/15. Grave M. Petrović Jr. 34: Truhelka 1904, 97, Pl. XLVII/10, 13, 15; Gavranović 2011b, 139, Fig. 175/7–9. Grave M. Petrović Jr. 35: Truhelka 1904, 98, Pl. XLVIII/16; Gavranović 2011b, 131, Fig. 163/5. Cremation grave S. Jakarić 15: Truhelka 1904, 108, Pl. LVI/9; Marić 1964, Pl. XIII/32; Gavranović 2011a, 201, Fig. 190/2; 2011b, 139, Fig. 139/2. Grave I. Stipančević 14: Truhelka 1904, 131, Pl. LXXVI/11.

¹²⁰ Truhelka 1904, 105, Pl. LIII/30.

Donja Dolina.¹²¹ Chronological considerations of the Donja Dolina cemetery attach particular importance to graves in which these fibulae appear together with those of other types – especially those characteristic of the western and Central Balkans (Glasinac).

Serpentine fibulae are considered one of the characteristic forms of phase 2c in Donja Dolina,¹²² dated to around the middle and the second half of the 6th century BC.¹²³ In Lower Carniola, serpentine fibulae with a twisted bow and a plate at the junction of the bow and the pin are also regarded as one of the leading forms of the horizon named after them, and are characteristic of the south-eastern Alpine region.¹²⁴ A detailed classification of serpentine fibulae was made by S. Tecco Hvala, who classified fibulae with a saddle-shaped bow without a plate as variant IVa, and those with a plate as variant IVb. Fibulae of both variants have a long, J-sectioned foot that may have a globular expansion at the end. Variant IVb fibulae have a plate or disc at the junction of the bow and the pin, which is either cast or fitted onto the bow. They are most commonly found in women's graves and are rarer in men's. These fibulae are the most numerous form of serpentine fibulae in the south-eastern Alpine region, as they are characteristic for Lower Carniola and the Sveta Lucija group, but have also been recorded in the northern Adriatic area and eastward along the Sava river to Donja Dolina. They are dated from the middle of the 6th century to the beginning of the 5th century BC.¹²⁵

As already noted, grave M. Petrović Jr. 35 included two serpentine fibulae of variant Va, with two small wings positioned above the saddle-shaped bow (Fig. 5). At the junction of the bow and the pin there is a plate, while the foot ends in a trumpet-shaped terminal.¹²⁶

These fibulae, like those of variant IVb, are also dated to phase 2c,¹²⁷ corresponding to the middle and second half of the 6th century BC; it should be emphasized that the best parallels have been recorded in cemeteries in Lower Carniola.¹²⁸ B. Teržan dates them in the same way as at the Donja Dolina cemetery, noting that the mentioned grave contains them together with fibulae of the Arareva gromila type and a local plate fibula.¹²⁹ This is certainly a recognizable form of the serpentine fibula horizon in Lower Carniola.¹³⁰ As already mentioned, the analysis of S. Tecco Hvala distinguishes serpentine fibulae with wings as type V, characterized by specially crafted wings that are paired and attached with a rivet through a hole at the bend of the bow, with the upper part of the wings decorated with protrusions. At the junction of the bow

and the pin there is typically a plate. Smaller fibulae without decoration on the bow and foot are distinguished as variant Va. Serpentine fibulae of type V are considered a product of the south-eastern Alpine region; in Lower Carniola, they are the most numerous fibulae after type IV, being the only form in half of the graves. They have been recorded in both female and male graves as pairs, as well as in a grave in Donja Dolina. They are dated to the later part of the serpentine fibula phase, but also appear in the earlier phase of the Certosa fibula horizon. They are characteristic for Lower Carniola, and are also found in the areas of the northern Adriatic and southern Alps, extending eastward as far as Donja Dolina.¹³¹ Additionally, a serpentine fibula was found in the female inhumation

¹²¹ Grave N. Šokić I 29: Truhelka 1904, 116, Pl. LXV/16. Grave S. Jakarić 19 with two fibulae: Truhelka 1904, 109, Pl. LVI/22; Čović 1961, Y26/7–8; Gavranović 2011b, 130, Fig. 161/7–8.

¹²² Čović 1987a, 252–253.

¹²³ Gavranović 2011a, 201.

¹²⁴ Teržan 1974, 41, 44; 1976, 384, 392, Fig. 54/18; Gabrovec 1987, 50, 56, 58, Fig. 4: 6, Pl. VII/7, 10; Dular 2003, 131, Fig. 76/16; 77/2, 5, 17–18, 27. S. Gabrovec points out that certain variants of serpentine fibulae, which are of Italic origin – including those with a small plate or without one – have already appeared in the Stična 2 phase. S. Tecco Hvala (2012, 268, 348) reaches the same conclusion.

¹²⁵ Tecco Hvala 2012, 233, 236, 239–240, Fig. 88/5 (var. IVa), Fig. 88/6 (var. IVb); 90; 2014, 131, 148–150, 159, 161, Fig. 4/3–6; 9C, Map 7. On this form of serpentine fibulae see also: Parzinger 1988, 153, Pl. 143. B. Glunz (1997, 85, Map 17) attributes the fibulae from grave M. Petrović Jr. 34 to serpentine fibulae S2 type A, with a plate set in the middle of the bow-to-pin transition, and attributes the other serpentine fibulae in Donja Dolina to type B, with a plate below the middle of the bow-to-pin transition. The classification by A. Nascimbene (2009, 69–71, Fig. 12–13) also lists serpentine fibulae from Donja Dolina, attributing them to type I.1, variant A, dated to the second half of the 6th century and the beginning of the 5th century BC.

¹²⁶ Truhelka 1904, 98, Pl. XLVIII/13, 15; Čović 1961, Y27/3–4; Marić 1964, Pl. XIII/30; Čović 1987a, 252, Pl. XXVII/14; Gavranović 2011a, 201, Fig. 190/3.; 2011b, 131, Fig. 163/3–4.

¹²⁷ Čović 1987a, 252–253, Pl. XXVII/14.

¹²⁸ Gavranović 2011a, 201; 2011b: 131.

¹²⁹ Teržan 1974, 41, 44; 1987, 19; 1998, 521.

¹³⁰ Gabrovec 1987, 56, 58, Fig. 4/10, Pl. VII/11; Dular 2003, 131, Fig. 76A/3–4; 77A/1, 4; Kruh 2010, 94.

¹³¹ Tecco Hvala 2012, 233, 240, 351, Fig. 88/11; 90; 2014, 133, 150–152, 159, Fig. 5/1–3; 9C, Map 8. B. Glunz (1997, 81) also attributes the fibulae from grave M. Petrović Jr. 35 to type C, while A. Nascimbene (2009, 75–76, 86, Fig. 14–16) classifies them as type I.2 with two variants, based on the decoration and shape of the bow, attributing the Donja Dolina fibulae to variant B, dated from the second quarter to the end of the 6th century BC.

grave 46 at the Vekerzug culture cemetery in Algyő in the Tisza valley.¹³²

In conclusion, serpentine fibulae of both variants are a characteristic women's costume item in Donja Dolina and indicate direct contacts with Lower Carniola. They have been found in graves dated to around the middle and the second half of the 6th century BC; it is particularly significant that they appear alongside fibulae of Balkan origin.

Fibulae with three knobs on the bow (*a tre bottoni*)

The richly furnished child grave N. Šokić II 5, with small temple rings of variant D1a, included four small single-loop fibulae, featuring a ribbed bow with a small button-like protrusion at the top and on each side. The foot has not been fully preserved, but it was probably narrow and triangular.¹³³ Another fibula of this form, with a narrow and long triangular foot, was found on the chest of the body in the warrior grave M. Petrović Jr. 52.¹³⁴ Two fibulae with three knobs on the bow, but of somewhat different forms, were stray finds from the cemetery.¹³⁵

Fibulae with three knobs on the bow (*a tre bottoni*), which are not numerous in Donja Dolina, are dated to phase 2b.¹³⁶ M. Gavranović points out that these fibulae are distributed in the south-eastern Alpine region as well as the northern and central Adriatic, and are dated to the late 7th century and the first half of the 6th century BC. Based on the cross-section of the foot (C or J) and its terminal, regional variants can be identified. The fibulae from the two mentioned graves in Donja Dolina are assigned to the widespread and numerous Grottazzolina type, known from sites in northern Italy and Picenum, where they appear at the end of the 7th century BC and persist until the horizon of Certosa fibulae.¹³⁷ One fibula, a stray find from the cemetery, is believed to be the “leech-shaped” (*Sanguisuga*) fibula with three knobs and is dated to the 6th century BC,¹³⁸ while another with a strap bow is identified as the Vinkov Vrh variant fibula (type VII), which represents one of the latest forms of three-knob fibulae that appear in greater numbers in the earlier part of the Certosa fibula horizon in Lower Carniola.¹³⁹ Two poorly preserved fibulae with three small knobs at the top of the bow come from tumulus V, grave 1 in Kaptol, where they were found with a ribbed-bow fibula. The grave is dated to horizon 3 of the Martijanec-Kaptol group, corresponding to the beginning of the 6th century BC.¹⁴⁰

Fibulae with three knobs in Donja Dolina arrive from the west, from Lower Carniola, where they appear during the Stična 2 phase, while the youngest examples, such as the Vinkov Vrh variants (type VII), are dated to the earlier phase of the Certosa fibula (with Certosa fibulae type IIa).¹⁴¹ A detailed analysis of three-knob fibulae was conducted by M. Egg based on finds from tumulus 1 in Strettweg. He notes that fibulae of this form, which are divided into numerous types, are distributed in Italy and the eastern Alps. The fibulae from both graves in Donja Dolina most closely resemble the smaller examples with plate-shaped knobs and no expansion at the end of the foot, which is why they are classified within the heterogeneous group of leech-shaped (*sanguisuga*) fibulae with three knobs.¹⁴² One stray find from the cemetery in Donja Dolina is defined as a Vinkov Vrh type fibula, and another as a leech-shaped fibula with three knobs,¹⁴³ similar to the fibulae from the graves. It is noted that three-knob fibulae are most numerous in Picenum, where they originated in the second half of the 7th century BC, then in the

¹³² Bende 2003, 66, Fig. 3/10; Kemenczei 2004, 96, Fig. 7/12. A. Kozubová (2022, 137, Fig. 3/1) attributes the fibula to variant VIb.

¹³³ Truhelka 1904, 134, Pl. LXXVII/28; Gavranović 2011a, 200, Fig. 187/4. The grave also contained a plate fibula, a boat-shaped fibula, two fibulae with a loop at the top of the bow, three bronze bracelets, a bronze ring, and a horse gear separator. About these fibulae see: Dizdar, Kapuran 2021, 186, 191–193.

¹³⁴ Truhelka 1904, 104, Pl. XLI/14; Gavranović 2011a, 200, Fig. 187/3; 2011b, 136, Fig. 171/3.

¹³⁵ Truhelka 1904, 144, Pl. LXXXI/4; Marić 1964, Pl. IX/22; XIII/18.

¹³⁶ Čović 1987a, 248–249, Fig. 15/11.

¹³⁷ Gavranović 2011a, 199–200.

¹³⁸ Marić 1964, Pl. IX/22; Gavranović 2011a, 200, Fig. 188/1. There is a small expansion at the end of the long foot.

¹³⁹ Marić 1964, Pl. XIII/18; Gavranović 2011a, 200, Fig. 188/2.

¹⁴⁰ Vinski-Gasparini 1987, 209, Fig. 13/8–9, Pl. XX/13–14.

¹⁴¹ Teržan 1974, 38, 40; 1976, 344–345, Fig. 15; 1990, 150, 158; Gabrovec 1987, 49, 68, Fig. 3/2, 7; 5/15; Ogrin 1998, 127, 129; Dular 2003, 118, 136, Fig. 70/7, 14–16; 80: 2; Tecco Hvala 2012, 218–223, 348; Božić 2016, 161, Pl. 1/4.

¹⁴² Egg 1996, 187–190, Fig. 115/3.

¹⁴³ Egg, 1996, 194. B. Glunz (1997, 22–23, 35, 166, Map 1) distinguishes type B fibulae: those with three flat knobs at the top, a rhomboid-sectioned bow ribbed on both sides towards the spiral and foot, and a small knob at the end of the long and narrow foot. One fibula from Donja Dolina (Marić 1964, Pl. IX/22) is attributed to this type. Type B fibulae are most widespread in Lower Carniola. The oldest fibulae with three knobs are dated from the beginning of the second half of the 7th century, and type B also to the first quarter of the 6th century BC.

south-eastern Alpine region where they underwent local development, and among the Japodes, with some types showing wide distribution, though most remain local. In Lower Carniola, they are dated from the Stična 2 phase, while Vinkov Vrh type fibulae belong to the earlier phase of the Certosa fibula horizon.¹⁴⁴ Three-knob fibulae have also been thoroughly analysed by M. Ogrin, who divides them into 11 types with variants based on the cross-section of the bow and the shape and ending of the foot.¹⁴⁵ She attributes one fibula from the cemetery to type VII, with a smooth, undecorated bow and a distinctly raised, profiled foot ending (Vinkov Vrh type, according to M. Egg),¹⁴⁶ and assigns another to variant Xb, which has a semi-circular ribbed bow with three plug-like or cylindrical knobs and a long, narrow, J-sectioned triangular foot ending in a knob.¹⁴⁷ This fibula is similar to those from grave N. Šokić II 5, although they do not have a preserved foot. Type VII fibulae are distributed in Picenum and the south-eastern Alpine region as far as Donja Dolina, and are dated to the serpentine fibula phase and the earlier phase of Certosa fibulae.¹⁴⁸ Variant Xb fibulae are dated to Ha D1, with the example from Donja Dolina dating to the middle of the 6th century BC.¹⁴⁹

In conclusion, fibulae with three knobs on the bow (*a tre bottoni*) in Donja Dolina have been recorded in a male and a child grave that can be dated to the beginning of the 6th century BC; it is not easy to assign them to already known types within this highly heterogeneous group. Those that are stray finds from the cemetery have been assigned to types Xb and VII and indicate cultural connectivity with Lower Carniola.

Fibulae with a ribbed bow

Grave M. Petrović Jr. 43, with temple rings of variant D1c, included a small single-loop bow fibula, featuring a densely ribbed bow of round cross-section and a long, narrow foot (Fig. 12).¹⁵⁰ Fibulae of this form, whose foot may end in a small globular expansion, have been found in several other graves in Donja Dolina, most of which are notable for the number and quality of finds,¹⁵¹ while one is a stray find from the cemetery.¹⁵² The ribbed-bow fibulae developed into the already described fibulae with knobs or an eyelet at the top of the bow, as suggested by the shape of the bow and foot.¹⁵³

Fibulae with a ribbed bow in Donja Dolina are dated to phase 2b.¹⁵⁴ B. Teržan considers them to represent the “ribbed” style, appearing in the Stična 2

phase, and to be an important part of costume in the first half of the 6th century BC, while the latest finds are dated to around the middle of the 6th century BC (late Ha C2 and Ha D1). Two variants are distinguished – smaller ones with a densely ribbed bow and larger ones with wider ribs on the bow. They are distributed in the south-eastern Alpine region, northern Italy and the Soča Valley, as well as western Hungary.¹⁵⁵ It is notable that these fibulae in Donja Dolina appear in graves of richly equipped individuals, dated to the end of the 7th century and the beginning of the 6th century BC.¹⁵⁶ The closest find of a fibula of this form is known from Kaptol (tumulus 5, grave 1), which is dated to horizon 3 of the Martijanec-Kaptol group, corresponding to the beginning of the 6th century BC.¹⁵⁷ Ribbed-bow fibulae are known from settlements and graves in western Hungary, where they

¹⁴⁴ Egg 1996, 203–215, Fig. 117; 119; Egg, Krämer 2016, 83, 210.

¹⁴⁵ Ogrin 1998; Tecco Hvala 2012, 218–223.

¹⁴⁶ Ogrin 1998, 113, Fig. 15; Tecco Hvala 2012, 220, Fig. 84/6–7. Fibula: Marić 1964, Pl. XIII/18. Fibulae with three knobs from two graves in Donja Dolina are not mentioned.

¹⁴⁷ Ogrin 1998, 114, Fig. 18b; Tecco Hvala 2012, 222. Fibula: Marić 1964, Pl. IX/22.

¹⁴⁸ Ogrin 1998, 125, 129, Fig. 36; Tecco Hvala 2012, 221–223, 268, 354, 358.

¹⁴⁹ Ogrin 1998, 127, Fig. 30.

¹⁵⁰ Truhelka 1904, Pl. L/23; Marić 1964, Pl. XVII/1. The grave also contained two Early La Tène fibulae (LT B1) and other costume and jewellery items that are later than this fibula, meaning the fibula may have been placed in the grave subsequently.

¹⁵¹ Grave M. Petrović Jr. 1: Marić 1964, Pl. XIII/16. Grave M. Petrović Jr. 37 with two fibulae: Truhelka 1904, 100, Pl. XLIX/10–11; Čović 1987a, 248, Pl. XXVII/7; Gavranović 2011b, 136, Fig. 170/10–11. Grave M. Petrović Jr. 39: Truhelka 1904, 100, Pl. L/10; Gavranović 2011a, 195, Fig. 181/1; 2011b, 134, Fig. 169/9. Cremation grave M. Petrović Jr. 53: Truhelka 1904, 104, Pl. LIII/8. Grave I. Stipančević 8: Truhelka 1904, 128, Pl. LXXV/12; Čović 1987a, 248, Pl. XXVII/8; Gavranović 2011b, 137, Fig. 173/3. Graves M. Petrović Jr. 39 and I. Stipančević 8 with Borajna-type fibulae, influencing their appearance, according to B. Teržan (Teržan 1987, 19).

¹⁵² Truhelka 1904, 144, Pl. LXXXI/3; Gavranović 2011a, 195, Fig. 181/2.

¹⁵³ Dizdar, Kapuran 2021, 192–193.

¹⁵⁴ Čović 1987a, 246, 249.

¹⁵⁵ Teržan 1974, 32, 38, 41–42, 45, Fig. 6, Pl. 4/3–4 (Brusnice VII/3); 1987, 19, Fig. 11; 1990, 42–43, 68, 150, 158. S. Gabrovec (1987, 58, Fig. 4/11; 2010, 53, Pl. 75/1–2) dates fibulae with a ribbed bow to the serpentine fibula phase.

¹⁵⁶ Gavranović 2011a, 195.

¹⁵⁷ Vinski-Gasparini 1987, 208–209, Fig. 13/6, Pl. XX/15; Potrebica 2003, 222, Pl. I/9.

are, likewise, dated to Ha D1, while later forms with narrow ribbing on the bow are known from the Sopron–Krautacker settlement.¹⁵⁸

In conclusion, ribbed-bow fibulae in the Donja Dolina cemetery appear in both male and female graves dated to the beginning of the 6th century BC (Ha D1), some of which are richly furnished. They indicate contacts with Lower Carniola and the Western Carpathian Basin.

Rusanovići-type fibulae

Distinctive forms of bronze fibulae in the cemetery at Donja Dolina include single-loop bow fibulae of types Rusanovići and Arareva gromila, whose origin is found in Glasinac. A Rusanovići-type fibula was discovered in the cremation grave S. Jakarić 15, together with temple rings of variant D1a and a serpentine fibula of type IVb (Fig. 3). The fibula features a boat-shaped bow with longitudinal ribs at the top and narrow transverse ribbings on each side towards the spiral and the foot. The fibula's spiral is unilateral with a single coil; at the end of the long foot there is a ring.¹⁵⁹

B. Teržan identified Rusanovići-type fibulae as a Glasinac form of boat-shaped fibula. These are single-loop bow fibulae with a longitudinally ribbed boat-shaped bow and a long, narrow, asymmetrical triangular or trapezoidal foot ending in a ring. She believed that these fibulae developed under the influence of south-eastern Alpine boat-shaped fibulae of the Šmarjeta type from the Stična 2 phase in Lower Carniola, and that the Rusanovići type emerged as an imitation of these fibulae at roughly the same time. She subsequently dated their origin to the end of the 7th century BC, and their use mainly to the first half of the 6th century BC, as a characteristic form of Glasinac phase IVc-2. Teržan also emphasized that Donja Dolina, as a site bringing together various types, acted as a mediator in the exchange of ideas regarding the development of certain forms of fibulae. Rusanovići-type fibulae are not only present in Glasinac, but also more widely distributed in western Serbia.¹⁶⁰ B. Čović dates Rusanovići-type fibulae from Donja Dolina to phase 2c¹⁶¹ and those from Glasinac to phase IVc-2; they often have a longitudinal-transverse ribbed bow, which is most often hollow, but can also be solid-cast. The elongated triangular foot ends in a ring, from which various types of pendants often hang.¹⁶² M. Gavranović also points out that Rusanovići-type fibulae, in a broad sense, belong to the group of fibulae with a boat-shaped bow decorated with longitudinal and

transverse ribbing, while the triangular or trapezoidal foot most often ends with a ring, and less frequently with a conical knob. This method of crafting a bow is characteristic of the late 7th century and the beginning of the 6th century BC. He dates those from Glasinac to the late 7th century and the first half of the 6th century BC; additionally, he dates the grave S. Jakarić 15 to the Donja Dolina 2c phase.¹⁶³ Single-loop fibulae with a triangular or trapezoidal foot, transverse ribs on the bow, and a ring at the end of the foot are dated by R. Vasić to horizon 3 of the Early Iron Age.¹⁶⁴ In his detailed analysis of single-loop fibulae with a triangular or trapezoidal foot, i.e., fibulae of the Glasinac type, he distinguishes, based on the shape of the bow and foot, various types that show certain common characteristics, such as the appearance of the foot. Four basic types were identified: with a boat-shaped bow; with expansions on the bow; with a ribbed bow; with a smooth bow. Their centre of origin is Glasinac, from where they spread in various directions. In a large

¹⁵⁸ Kemenczei 2004, 92, Fig. 8/12; 9/1, 3. Also: Fekete 1986, 253, 257, Fig. 6/5–14; Jerem 1981, 204, 204, Pl. II/2, Map on p. 220; Kozubová 2022, 137, Fig. 5/5 etc.

¹⁵⁹ Truhelka 1904, 108, Pl. LVI/8; Marić 1964, Pl. IX/15; Gavranović 2011a, 195, Fig. 180/2; 2011b, 139, Fig. 176/1. This type may include the fibula from the destroyed grave I. Stipančević 8 (Truhelka 1904, 129, Pl. LXXV/14; Marić 1964, Pl. IX/14; Gavranović 2011b, 137, Fig. 173/4), which was found with three other different fibula types. The fibula has a double transverse expansion at the top of the bow and one at the end of the bow near the foot. Between them is a narrow, grooved section of the bow. The narrow foot is decorated with groups of vertical and oblique grooves and apparently ended with a ring. This grave is dated to phase 2b (Čović 1987a, 241, 248; Gavranović 2011b, 137). B. Teržan (1987, 23, Fig. 13) does not list it as a fibula of this type.

¹⁶⁰ Teržan 1974, 42; 1987, 17, 19, 23, Fig. 13. According to B. Teržan (1987, 19), the beginning of the production of Rusanovići-type fibulae is dated to the end of the 7th century BC, based on finds from grave 1 of tumulus LXXXXIV in Rusanovići (Benac, Čović 1957, 14, Pl. XXV/1–7). However, B. Čović (1987b, 604) assumes that this is not a certain grave context, i.e., that it includes both older and younger groups of finds.

¹⁶¹ Čović 1987a, 252–253.

¹⁶² Čović 1987b, 614, 619, Pl. LXII/25, 28, 33. They often appear with another form characteristic of phase IVc-2 – double-loop fibulae with a square foot and two holes: Benac, Čović 1957, Pl. XXXIII/1–2, 5; XXXV/1–4; XXXVIII/1–2, 8–9). N. Lucentini (1981, 75, Fig. 2/15–18) distinguishes two types, one of which has three variants, based on the shape and decoration of the bow. H. Parzinger (1992, 233, Fig. 9/2) also points out that Rusanovići-type fibulae are centred between the Bosna and Ibar rivers.

¹⁶³ Gavranović 2011a, 195; 2011b, 139.

¹⁶⁴ Vasić 1977, 24, Pl. 25/1–2; 29/9; 39/2, 4, 9; Zotović 1985, 74–76, Pl. XXII/5, 11.

number of graves, fibulae of different types often appear together, indicating their contemporaneity, but there are certain chronological differences. A group of smaller fibulae (length 3 to 7 cm) features a hollow boat-shaped or solid bow and a long, usually trapezoidal foot ending in a ring. The central part of the bow is decorated with longitudinal ribs or, more rarely, lines. On both sides of the bow, there are also transverse lines or ribs. The outer side of the foot may be decorated with incised lines, and at the end of the foot there is a ring or, only rarely, a conical knob (which would actually correspond to Potpećine-type fibulae after B. Teržan). Given the differences in the shape of the bow and foot, the existence of various variants and subvariants is emphasized; those with a hollow bow are considered older than those with a solid-cast bow, although it is known that both types also appear simultaneously. These fibulae appear in graves either singly or in pairs, as well as alongside other types of fibulae. Most are dated to the second half of the 6th century BC (phase IVc-2), with their origin – possibly at the beginning of the 6th century BC – showing the influence of Italic boat-shaped fibulae, which probably went through Donja Dolina to reach Glasinac, where they further developed into a range of new forms. R. Vasić also notes that the greatest number are found in the Glasinac area (eastern Bosnia) and at sites in western and south-western Serbia. To the north, they reach as far as Syrmia and eastern Serbia, and to the south, as far as Herzegovina, Kosovo, and northern Albania.¹⁶⁵ The latest analysis of Rusanovići-type fibulae, based on finds from the area around Čajniče – which belongs to a distinct variant with a pronounced crest at the top of the bow – also highlights their wide distribution and occurrence in both women's and men's graves. Dated to Glasinac phase IVc-2, they continued to be worn into the 5th century BC, corresponding to the beginning of phase Va.¹⁶⁶

In conclusion, Rusanovići-type fibulae in the cemetery at Donja Dolina – if the type is made to include the fibula from grave I. Stipančević 8 – indicate contacts with the Glasinac area, where they likely originated. Fibulae of this form show that this is a heterogeneous group with different variants. Rusanovići-type and Arareva gromila-type fibulae in Donja Dolina have been recorded together with temple rings in women's graves from the second and third quarters of the 6th century BC; significantly, they appear in graves alongside fibulae characteristic of the south-eastern Alpine region.

Fibulae of the Arareva gromila type

Important fibula types in the cemetery at Donja Dolina include the Arareva gromila type, which was found together with temple rings of variant D1b in the already mentioned grave M. Petrović Jr. 35 (Fig. 5). These single-loop bow fibulae have a strongly ribbed bow and a high, asymmetrical trapezoidal foot ending in a knob. The foot is decorated with a group of narrow vertical grooves along each edge and with a zigzag line along the upper and lower edges. Each fibula pin has three rings.¹⁶⁷ A fibula of a younger variant of the Arareva gromila type was found in grave N. Šokić I 29, also together with a serpentine fibula of variant IVb.¹⁶⁸ Chance finds from the cemetery are also known; based on their shape, they also belong to the younger variant, with only faintly ribbed or smooth bows.¹⁶⁹ Two Arareva gromila type fibulae were found, together with two silver temple rings, on the shoulders and chest of the woman in the grave Šabac–Jela (Fig. 11). The bow has a deltoid cross-section and is ribbed on the upper side. The tall trapezoidal feet, ending in an expansion, are decorated with horizontally arranged motifs of hatched triangles or with vertical incisions in two fields.¹⁷⁰

These fibulae were also identified as a distinct form by B. Teržan, who classifies them among the fibulae types of the Glasinac circle and dates them to the second half of the 6th century BC.¹⁷¹ She emphasizes that Arareva gromila-type fibulae – which are thought to have developed from the Borajna and Potpećine types – are characterized by a strongly ribbed bow and a high, asymmetrical, often decorated trapezoidal foot. She dates them to Glasinac phase Va, giving particular importance to finds in graves in Donja Dolina with

¹⁶⁵ Vasić 1999, 89–92, Pl. 44/665–45/690; 64B. He suggests that they may have lasted into the 5th century BC, which is unlikely.

¹⁶⁶ Jašarević, Forić Plasto 2018, 66–67, Fig. 5.

¹⁶⁷ Truhelka 1904, 97, Pl. XLVIII/11–12; Čović 1961, Y27/1–2; Marić 1964, Pl. XIII/12; Čović 1987a, 252, Pl. XXVIII/1; Gavranović 2011a, 202; 2011b, 131, Fig. 163/1–2. This is a richly furnished woman's grave that included two variants of serpentine fibulae (IVb and Va), a plate fibula, a cross-shaped clasp, a belt set with rosette-shaped clasps, and ribbed bracelets.

¹⁶⁸ Truhelka 1904, 116, Pl. LXV/14; Gavranović 2011a, 202, Fig. 192/1.

¹⁶⁹ Truhelka 1904, 114, Fig. 84–85; Marić 1964, Pl. XIII/11; Gavranović 2011a, 202, Fig. 192/3.

¹⁷⁰ Vasiljević 1977, 169, Fig. 2/1–2; Vasić 1999, 95, Pl. 48/792–793; Jašarević 2024, 46, Fig. 4/5–6.

¹⁷¹ Teržan 1974, 44; 1976, 376–377, Fig. 46/3.

serpentine fibulae and ribbed bracelets from the middle of the 6th century BC. They continued to appear during the first half of the 5th century BC. Their distribution includes Glasinac, western Serbia, the area along the Sava river from Donja Dolina, as well as Hercegovina and northern Albania.¹⁷² In Donja Dolina, Arareva gromila-type fibulae (the Glasinac ribbed fibula type) are associated with phase 2c,¹⁷³ while in Glasinac they are considered characteristic of phase IVc-2, noting that the trapezoidal foot became larger over time – such examples belong to phase Va, although fibulae with smaller feet can still be found at that time.¹⁷⁴ M. Gavranović also dates the emergence of Arareva gromila-type fibulae to the end of phase IVc-2, corresponding to the second half of the 6th century BC, and notes that they continued into the developed 5th century BC. The difference between older and younger forms is that the bow of the older examples is strongly ribbed, sometimes shaped like a series of beads, while the younger ones have only slightly ribbed or even smooth bows and a large trapezoidal foot. This younger variant is dated from the late 6th to the middle of the 5th century BC and he also emphasizes their wide distribution.¹⁷⁵ R. Vasić dates fibulae with a ribbed bow and triangular or trapezoidal foot to horizon 3, while the younger forms with transverse grooves on the bow and a large trapezoidal foot may even appear at the beginning of horizon 4.¹⁷⁶ Similar to the analysis of Rusanovići-type fibulae, R. Vasić considers these fibulae as part of a heterogeneous group of single-loop bow fibulae, the so-called Glasinac type. He singles them out as bow fibulae with a ribbed bow, rarely having transverse grooves on the upper side of the bow. They most often have a trapezoidal foot, frequently decorated with incised lines, rarely triangular, and ending in a knob. Their length is 5 to 7 cm, and they were mostly worn in pairs – often even two or three pairs – although they also appear in combination with other fibula forms. He dates them to Glasinac phase IVc-2, from the middle of the 6th century to the first third of the 5th century BC (phase Va), based on finds from Novi Pazar. Differences in the shape of the bow and foot would indicate different workshops where they were produced. A distinct type consists of fibulae with a smooth bow of mostly rhomboid cross-section and a large triangular or trapezoidal foot ending in a knob. These are considered a further development of fibulae with a trapezoidal or triangular foot in the late 6th century BC; they have been recorded in Glasinac and south-western Serbia as well as in

the Symria region, where they are thought to be products of local workshops under southern influence and are dated up to the middle of the 5th century BC.¹⁷⁷ In the latest analyses of Arareva gromila-type fibulae, it has also been emphasized that the older variant, dated to Glasinac phase IVc-2, is characterized by a strongly ribbed bow. The younger examples are larger and belong to phase Va. They are found in both male and female graves, either individually, in pairs, or with other fibula types, and are dated from the middle of the 6th century to the middle of the 5th century BC.¹⁷⁸ Interestingly, fibulae of the younger variant have been found at sites in the Danube region.¹⁷⁹

In conclusion, single-loop fibulae of the Arareva gromila type at the cemetery in Donja Dolina also indicate direct contacts with Glasinac. They are a characteristic part of both women's and men's dress. In Donja Dolina, they have been recorded in graves dated to around the middle and the second half of the 6th century BC; importantly, they appear alongside forms characteristic of the south-eastern Alps (serpentine fibulae of types IVb and Va), which has enabled the correlation of distinct chronological phases in these regions.¹⁸⁰

Fibulae of the Novi Pazar type

The richly furnished woman's grave 2 in Bere Mend, with four silver temple rings of variant D3b,

¹⁷² Teržan 1987, 19, 24, Fig. 14. H. Parzinger (1992, 217, 234, Fig. 10/3) also points out that Arareva gromila-type fibulae are found between the Bosna and Drina rivers, then north to the Sava, east to the Ibar, and south to the Devoll.

¹⁷³ Čović 1987a, 252. Phase 2c is dated to the last quarter of the 6th century BC in absolute chronology, which is too late. More on this: Dizdar, Potrebica 2021, 33–34, fn. 208.

¹⁷⁴ Čović 1987b, 618–619, 630, Fig. 36/18, Pl. LXIV/11. N. Lucentini (1981, 75, 110, Fig. 2/19) distinguishes them as fibulae with a ribbed bow and dates them from 575 to 525/500 BC.

¹⁷⁵ Gavranović 2011a, 202–203, 240, Fig. 192; 2011b, 131, Fig. 163. Grave M. Petrović Jr. 35 is dated to the second half of the 6th century BC, i.e., not before the middle of the 6th century BC.

¹⁷⁶ Vasić 1977, 24, 26, Pl. 25/8; 34/13; 52/1–2; 1987b, 645, Pl. LIX/8; Zotović 1985, Pl. XXII/3.

¹⁷⁷ Vasić 1999, 95–98, Pl. 48/774–49/800; 49/801–820; 64B. He considers that they originated in eastern Bosnia and south-western Serbia in the middle of the 6th century BC.

¹⁷⁸ Blečić Kavur, Miličević-Capek 2011, 43–45, Fig. 7–8; Jašarević 2024, 44–48, Fig. 8–9, Pl. 4/17–21.

¹⁷⁹ Dizdar 2019, 327–329, Fig. 1/2; 2020, 206; Jašarević 2024, 47, Fig. 4/5–6.

¹⁸⁰ Teržan 1987, 19; Čović 1987a, 252; Gavranović 2011a, 202; Jašarević 2024, 44–48.

included two silver single-loop fibulae with a square foot, of the Novi Pazar type, which differ in the decorative motifs on the bow and the foot. The fibulae are cited as evidence of contacts with the regions of Syrmia and the Central Balkans, and are dated to the beginning of the 5th century BC.¹⁸¹

These fibulae were systematically analysed by M. Guštin and B. Teržan, who describe them as fibulae with a rectangular foot and emphasize that they are characteristic for the end of the 6th and the 5th centuries BC. Finds in the southern Carpathian Basin (eastern Slavonia, Syrmia, and Baranya) are considered evidence of contacts with the Central Balkans.¹⁸² R. Vasić proposed a detailed analysis of single-loop bow fibulae with a square or rectangular foot and a saddle-shaped upper side ending in a knob, dividing them into several types. He identified the later examples as the Novi Pazar type, widespread in the Central and western Balkans, which dates to horizon 3 of the Early Iron Age and continues into horizon 4, having developed from the earlier Marvinci-Gogošu type.¹⁸³ This is a distinctive group of bow fibulae, 3 to 6 cm in length. In addition to copper alloy, they were often made of silver and gold. The bow is of round or profiled (octagonal) cross-section, decorated with longitudinal lines, sometimes accompanied on both sides by groups of transverse lines. The foot is adorned with various decorations, often organized into compositions, most commonly tremolo lines, rows of rings-and-dots, or semicircles, which also have chronological significance. In graves, these fibulae appear both individually and in pairs, and when found in pairs, they are most often made of silver and gold. They are distributed across the Central and western Balkans, extending south to Herzegovina and northern Albania, with a concentration also in the Danube region (Syrmia), while they are rare in Glasinac. Additionally, they are known from sites in Oltenia, north-western Bulgaria, and eastern Hungary. They are dated from the end of the 6th century to the middle of the 5th century BC, but their use continued even later. The appearance of gold and silver fibulae, based on finds from Atenica and Novi Pazar, is dated to the end of the 6th century and the beginning of the 5th century BC, which is associated with the more frequent occurrence of jewellery made from precious metals in rich graves; these fibulae matched the taste of the local aristocracy and were produced in local workshops.¹⁸⁴ D. Gergova classified single-loop fibulae with a square foot as type III A4 with three variants; the Novi Pazar type corre-

sponds to variant γ .¹⁸⁵ As R. Vasić pointed out, Novi Pazar type fibulae are not numerous in Glasinac, where a local variant with a knee transition from the bow to the foot developed;¹⁸⁶ they are considered a characteristic form of phase Va, dating to the end of the 6th and the 5th century BC.¹⁸⁷ In the most recent analysis of Novi Pazar type fibulae and their variants, it was concluded that they appear in women's graves in the Central and western Balkans, often in richly furnished burials. They were frequently worn in pairs and are dated to the end of the 6th century and the first half of the 5th century BC,¹⁸⁸ which is also the period to which finds from the Danube region can be attributed.¹⁸⁹ Their spread to the northern Carpathian Basin is evidenced by finds in cemeteries of the Vekerzug culture in the Tisza valley.¹⁹⁰

In conclusion, the single-loop bow fibulae of the Novi Pazar type in grave 2 in Beremend indicate direct contacts with the region of Syrmia and the Central Balkans. Fibulae of this form were a characteristic item of women's rich attire and have been recorded in graves that can be dated to the end of the 6th century and the 5th century BC, most often to the first half of the 5th century BC.

Fibula with a strap bow

The temple rings of variant D1c in grave N. Šokić I 26 were accompanied by a fibula with a strap-sectioned bow of angular outline, a long foot ending in a

¹⁸¹ Jerem 1973, 68, 74–76, Fig. 6/3–4; 9, Pl. XVI/1. The grave also contained three Certosa fibulae of type V. C. Metzner-Nebelsick (2002, 418, Fig. 187) dates the grave to the second half of the 6th century BC.

¹⁸² Guštin, Teržan 1976, 193, fn. 52, Map 2, Fig. 2/2. B. Teržan (1987, 19) dates them to the Glasinac Va phase. Also: Kilian 1975, 130–131, Pl. 85/3.

¹⁸³ A synthesis of the type Marvinci-Gogošu: Dizdar, Kapuran 2021, 187–189.

¹⁸⁴ Vasić 1977, 24, 26, Pl. 34/1–4; 36/1; 1987a, 46–48, 54, Pl. 2/1–5, 7; 3/1–8, App. 1; 1987b: 645, Pl. LIX/1–5; 1999, 71, 77–81, Pl. 41/582–42/626; 67A.

¹⁸⁵ Gergova 1987, 33–35, Pl. 7/92–95.

¹⁸⁶ Vasić 1987a, 47; 1999, 80; Gavranović 2011a, 198.

¹⁸⁷ Čović 1987b, 624–625, 630, Pl. LXIV/9 (faza IVc-2); LXIV/4; Gavranović 2011a, 198.

¹⁸⁸ Blečić Kavur, Miličević-Capek 2011, 42–43, Fig. 6; Teržan 2023, 172–176, Fig. 2, i.e., Kačanj: Marić 1959, 92–93, Pl. II/2, 4; 1976, 107, Fig. 4, Pl. II/4.

¹⁸⁹ Dizdar 2019: 329; 2020: 206; Soós 2021, 45.

¹⁹⁰ Kemenczei 2004, 87, 89, Fig. 6/6; Kozubová 2019, 121; 2022, 141, Fig. 7/2; 11.

globular expansion, and a small plate (disk) at the junction of the bow and the pin.¹⁹¹

This grave is dated to phase 3a-1 by B. Čović, who emphasizes that it represents a legacy from the previous phase, which was characterized by serpentine fibulae.¹⁹² M. Gavranović dates the grave to the beginning of the 5th century BC and highlights the distribution of strap-bow fibulae in the south-eastern Alpine region during the second half of the 6th century BC.¹⁹³ The appearance of strap-bow fibulae is dated to the end of the serpentine fibula phase, but they are also common in the earlier Certosa fibula horizon (with types I, II, and V).¹⁹⁴ In the analysis of fibulae from Magdalenska Gora, it was noted that strap fibulae with a long J-shaped foot ending in a knob were worn by both men and women. This is a southern Alpine variant of strap fibulae distributed from the Ticino River to Donja Dolina, with the highest concentration in the Soča Valley. They were worn together with later forms of serpentine fibulae and early types of Certosa fibulae.¹⁹⁵ Strap-bow fibulae with a plate at the junction of the bow and the pin have been distinguished as type I.4, with two variants based on the shape of the plate. The fibula from Donja Dolina is assigned to variant A, which was widespread in the south-eastern Alpine region and northern Italy from the middle of the 6th century to the middle of the 5th century BC.¹⁹⁶

In conclusion, the strap-bow fibula in grave N. Šokić I 26, as well as some other types of fibulae, indicates cultural contacts with Lower Carniola. It was found in a grave dated to the end of the 6th century and the beginning of the 5th century BC.

Certosa fibulae

Temple rings of variants D1a, D1b, and D1c (Tab. 3) in the Donja Dolina cemetery and at other cemeteries were found together with various forms of Certosa fibulae. These fibulae, except for variant XIIIh, are evidence of the continuity of intensive contacts between Donja Dolina – as well as the south-eastern Carpathian Basin and the western Balkans – and the south-eastern Alpine region during the Late Hallstatt period.

The older group is represented by Certosa fibulae of variants IIa, IIc, and V, which appear together (IIa and V) in grave M. Petrović Jr. 9 (Fig. 6).¹⁹⁷ It seems that a fibula of variant IIa in the double grave M. Petrović Jr. 12 appears together with one of variant XIIIc.¹⁹⁸ Additionally, grave N. Šokić I 26 was reported to include a fibula of variant IIc with a single-sided spiral.¹⁹⁹

B. Teržan points out that Certosa fibulae of type II, which are divided into seven variants based on the decoration of the bow and foot as well as the ending of the foot, are characterized as having a plate at the junction of the bow and the pin (except for variant c, which has a single-sided spiral). She believes these fibulae originated in Lower Carniola and the Soča Valley, where they have a notable concentration, and dates them to the earlier horizon of Certosa fibulae, corresponding to the end of the 6th century and the first half of the 5th century BC. Donja Dolina was likely an intermediary in the spread of these fibulae, as well as those of type V, towards the Danube region and the western Balkans. Additionally, S. Gabrovec points out that type II fibulae represent a combination of the Lower Carniola strap fibula and elements characteristic of Certosa fibulae.²⁰⁰ This combination was recorded in the aforementioned grave N. Šokić I 26. The graves in Donja Dolina with Certosa fibulae of variants IIa and IIc are dated by B. Čović to phase 3a-1,²⁰¹ while grave M. Petrović Jr. 12 may belong to the beginning of phase 3a-2.

Certosa fibulae of type V are contemporary with these, as evidenced by their joint occurrence in the

¹⁹¹ Truhelka 1904, 115, Pl. LXV/8; Marić 1964, Pl. XIII/23; Čović 1987a, 256, Fig. 16/3; Gavranović 2011a, 201, Fig. 191/1. Č. Truhelka describes the fibula as serpent-shaped. The grave also contained a plate fibula and a Certosa fibula of type IIc.

¹⁹² Čović 1987a, 256.

¹⁹³ Gavranović 2011a, 201–202.

¹⁹⁴ Teržan 1974, 45; 1976, 32; 1990, 103; Gabrovec 1987, 58, 68, Fig. 4/13, Pl. VIII/12; Dular 2003, 131, 136, Fig. 77/19. On fibulae with a strap bow and the same dating, as well as Donja Dolina as the easternmost site: Pare 1992, 435, 454, 460, Fig. 22, List 8.

¹⁹⁵ Tecco Hvala 2012, 242–244, 268, 351, Fig. 91/1–2.

¹⁹⁶ Nascimbene 2009, 93–95, Fig. 19–20.

¹⁹⁷ Truhelka 1904, 92, Pl. XLIV/5; Čović 1961, Y28/3; Marić 1964, Pl. XIII/29; Teržan 1976, 375–376; Gavranović 2011b, 131, Fig. 164/10. The Sanski Most-type fibula does not belong to this grave.

¹⁹⁸ Truhelka 1904, 93. A fibula of variant IIa was also found in the warrior grave M. Petrović Sen. 13: Truhelka 1904, 126, Pl. LXXIII/14.

¹⁹⁹ Truhelka 1904, 115, Pl. LXV/9; Teržan 1976, 321. With a strap fibula with a long foot and a plate fibula.

²⁰⁰ Teržan 1974, 45; 1976, 320–322, 348–349, 351–352, 375–376, Fig. 2; 16; 43; 1990, 103. Also: Gabrovec 1987, 67, Fig. 5/11, Pl. VIII/14; Dular 2003, 136; Tecco-Hvala 2012, 247, 256, 258, 268, 355, 358, Fig. 94/2, 6; Božić 2016, 161, Pl. 1/1.

²⁰¹ Čović 1987a, 256, Fig. 16/5; Gavranović 2011a, 203; 2011b, 131, Fig. 164. Grave M. Petrović Jr. 9 is dated to the beginning of the 5th century BC.

aforementioned grave M. Petrović Jr. 9 (Fig. 6).²⁰² A Certosa fibula of this type was also found in grave M. Petrović Jr. 21 together with one of variant Xc.²⁰³ There are also known stray finds of type V fibulae from the cemetery.²⁰⁴ Apart from Donja Dolina, Certosa fibulae of type V have been recorded elsewhere: with a temple ring of variant D1a in Ritešić;²⁰⁵ three fibulae with temple rings of variant D1c in grave 8 in Alsónyék;²⁰⁶ and three fibulae in grave 2 in Beremend with temple rings of variant D3b.²⁰⁷

Alongside fibulae of type XIII, Certosa fibulae of type V are the most numerous form found at sites in the Danube region and the western Balkans. These fibulae are widely distributed – from the Po River to the Danube – and are dated to the earlier horizon of Certosa fibulae, corresponding to the end of the 6th century and the first half of the 5th century BC, though they also appear later. They are most commonly found in women's graves; Donja Dolina was likely an intermediary in spreading these fibulae toward the Danube region,²⁰⁸ and these fibulae are evidence of established contacts that have not yet been documented for the preceding horizon of serpentine fibulae.²⁰⁹ Certosa fibulae of type V in Donja Dolina are dated by B. Čović to phase 3a-2,²¹⁰ although he previously dated grave M. Petrović Jr. 9 with this type of fibula to phase 3a-1. In Glasinac, they are considered a characteristic form of phase Va.²¹¹ Many finds come from sites in the Danube region, where they are dated to the end of the 6th century and the first half of the 5th century BC.²¹²

The Certosa fibulae of variant XIIIc with a crossbow-structured spiral, such as the one found in the aforementioned double grave M. Petrović Jr. 12 together with a variant IIa fibula, are considered to be a younger form.²¹³ A variant XIIIc fibula was also found in grave M. Petrović Jr. 48,²¹⁴ and there are also known stray finds from the cemetery.²¹⁵ At the Sanski Most cemetery, double grave 17 with the burial of a woman and child and temple rings of variant D1a included four Certosa fibulae of type XIIIc (Fig. 4).²¹⁶ The same type of temple ring seems to have been accompanied by two fibulae of variant XIIIc in grave 9 at the Szentlőrinc cemetery, in which a girl aged 7 to 10 years was buried.²¹⁷

Certosa fibulae of variant XIIIc are characterized by a crossbow-structured spiral, often rectangular in shape, which appears from the middle of the 5th century BC.²¹⁸ These fibulae have been found from Lower Carniola to the Danube region and the western

Balkans (similar to those of type V), and are dated to the later horizon of Certosa fibulae, corresponding to the second half of the 5th century BC. They are most frequently found in women's graves, where they could also be linked together with chains, although they were worn by men too. Donja Dolina was likely also an intermediary in spreading these fibulae toward the Danube region.²¹⁹ Certosa fibulae of type XIIIc in Donja Dolina are dated by B. Čović to phases 3a-2 and 3b, corresponding to the late 5th and 4th centuries BC.²²⁰

²⁰² Truhelka 1904, 92, Pl. XLIV/4; Čović 1961, Y28/4; Gavranović 2011b, 131, Fig. 164/11.

²⁰³ Truhelka 1904, 93, Pl. XLIV/30. In general, fibulae of type X, with numerous variants, appear in the later phase of the Certosa fibula horizon and the older part of the Negau helmet horizon, corresponding to the second half of the 5th century and the beginning of the 4th century BC: Teržan 1974, 45; 1976, 331–332, 365, 368, Fig. 4; 35; Gabrovec 1987, 67; Dular 2003, 114, Fig. 87/9; 89/1–2; Tecco Hvala 2012, 254, 258–259, Fig. 96/8.

²⁰⁴ Truhelka 1904, 145, Pl. LXXXI/6; Marić 1964, Pl. XIII/21.

²⁰⁵ Blečić Kavur, Jašarević 2016, 226, Fig. 2/2.

²⁰⁶ Soós 2020a, 57–58, Fig. 12/1–3; 23/5–7.

²⁰⁷ Jerem 1973, 68, Fig. 6/5–7, Pl. XVII/4–6; Metzner-Nebelsick 2002, 418, Fig. 187.

²⁰⁸ Teržan 1974, 45; 1976, 323–324, 352–353, 376, 382, Fig. 18; Guštin, Teržan 1976, 192, Map 2; Teržan 1987, 19; 1990, 103; 1998, 521, Fig. 7; Gabrovec 1987, 67, Pl. VIII/13; Dular 2003, 136, Fig. 85/1; Tecco Hvala 2012, 250, 256, 258, 355, 358, Fig. 94/8–10; Božič 2016, 161, Pl. 1/2.

²⁰⁹ Teržan 1998, 521; Dizdar 2020, 207, fn. 100.

²¹⁰ Čović 1987a, 258; Gavranović 2011a, 203; Blečić Kavur, Jašarević 2016, 226–227, Fig. 3.

²¹¹ Čović 1987b, 631, Pl. LXII/37; LXIV/7.

²¹² Dizdar 2019, 325–327; 2020, 207; Soós 2020a, 65–68, Fig. 23, Map 24; 2021, 48–49, Fig. 3, Map 3. Also: Vasić 1999, 99–100, Pl. 68A.

²¹³ Truhelka 1904, 93.

²¹⁴ Truhelka 1904, 103, Pl. LIII/13. With variant XIIIc.

²¹⁵ Marić 1964, Pl. XIII/25–26.

²¹⁶ Fiala 1899a, 70, Fig. 25; Čović 1987a, 258; Gavranović 2011b, 180, Fig. 251/4.

²¹⁷ Jerem 1968, 162, Fig. 20–9/3–4.

²¹⁸ Teržan 1976, 338–340, Fig. 5; Guštin, Teržan 1976, 190. Type XIII, which is highly heterogeneous, is divided into eight variants (a–h) based on the size of the fibulae, the shape of the foot and knob on the foot, and the decorations on the bow.

²¹⁹ Teržan 1974, 45; 1976, 338–340, 357, 359, 361–362, 377, 379, 382, Fig. 28; 30; Gabrovec 1987, 67–68, Pl. IX/1; Dular 2003, 136; Tecco Hvala 2012, 254–256, 258, 355, 358; Božič 2016, 161, Pl. 1/3. On new finds in the Danube region: Dizdar 2019: 330; 2020, 207.

²²⁰ Čović 1987a, 258–261, 266; Gavranović 2011a, 203; Vasić 1999, 101.

Grave 133 in Sanski Most contained temple rings of variant D1a together with two Certosa fibulae of type VIII. The grave is dated to phase 3a-2.²²¹ Fibulae of this form are larger in size, with a long bow that features a semi-circular expansion above the spiral. They are distributed in Lower Carniola and the southern Alps, and are dated to the later part of the Negau helmet horizon.²²²

They are contemporary with Certosa fibulae of variant XIIIh, featuring a decorated strap bow and a knob on a long neck, but the latter show a different distribution. Two fibulae of variant XIIIh were found in a pit with human remains and other finds designated as grave M. Petrović Jr. 13, which also contained a small twisted silver ring that may have served as a temple ring (Fig. 10).²²³ Double grave 122 in Sanski Most contained temple rings of variant D1a together with two Certosa fibulae of variant XIIIh.²²⁴ Additionally, two more fibulae of variant XIIIh were found in grave M. Petrović Jr. 5 and double grave N. Šokić I 4,²²⁵ as well as in grave A in Timenačka Greda.²²⁶ Numerous stray finds from cemeteries and settlements are also known,²²⁷ indicating the popularity of this fibula form at the end of the Early Iron Age in Donja Dolina. This is further evidenced by the find of a fibula in grave 3/82 in Šokića bašta (Šokić's garden), preserved only as a single spiral coil with loops for hanging pendants.²²⁸

Certosa fibulae of variant XIIIh are considered some of the youngest forms of this large fibula group in the Danube region. B. Teržan dates them to the first half of the 4th century BC; they often feature a double or triple crossbow-structured spiral.²²⁹ In Donja Dolina and Sanski Most, they are dated to the final, 3b phase (second half of the 4th century BC),²³⁰ while D. Božić places them in the Čurug phase, which represents the last phase of the Early Iron Age in the Danube region.²³¹ Besides Donja Dolina and Sanski Most, fibulae of variant XIIIh are known from a large number of sites in the Danube region, while they are rare outside it. They are dated to the end of the 5th century and the first half of the 4th century BC, and they appear to be somewhat older than the emergence of Early La Tène fibulae, although they were probably worn at the same time as well.²³²

In conclusion, various forms of Certosa fibulae frequently appear alongside temple rings of type D1 variants and silver variants D3b. In Donja Dolina, they are a characteristic item of female costume, as at other cemeteries, and indicate contacts with Lower Carniola – except for variant XIIIh, which can be con-

sidered a local form in the southern Carpathian Basin and northern areas of the western Balkans. These fibulae have been found in graves dated from the end of the 6th century and the beginning of the 5th century BC to the first half of the 4th century BC.

Early La Tène (LT B1) fibulae

The youngest forms of temple rings, especially the silver twisted-body rings of variant D3b, appear in graves together with Early La Tène fibulae (zoomorphic and early Dux type) from LT B1, to which we can add contemporaneous Sanski Most-type fibulae. These finds were defined by D. Božić as characteristic of the Čurug phase, which marks the final stage of the Early Iron Age in the Danube region and includes other forms such as the aforementioned Certosa fibulae of variant XIIIh.²³³

Alongside temple rings of variant D1c, grave M. Petrović Jr. 43 contained two different Early La Tène fibulae: an early form of a Dux fibula and a Zgrade-type fibula (Fig. 12).²³⁴ A Sanski Most-type fibula was found with a temple ring of variant D3b in grave 7 in trench B at the Timenačka Greda cemetery.²³⁵ In

²²¹ Fiala 1899a, 101, Fig. 145; Čović 1987a, 258, Pl. XXVIII/18.

²²² Teržan 1976, 329, 353, 368, Fig. 38; Gabrovec 1987, 74, Fig. 6/17; Dular 2033, 144; Tecco Hvala 2012, 323–324.

²²³ Truhelka 1904, 93, Pl. XLIV/20–21.

²²⁴ Fiala 1899a, 98.

²²⁵ Truhelka 1904, 91, Pl. XLIII/2; 112, Pl. LIX/9, 15.

²²⁶ Arsenijević 2019, 207, cat. no. 4.

²²⁷ Truhelka 1904, 70, 145, Fig. 46, Pl. LXXXI/7–8; Marić 1964, Pl. XIII/26; XVII/2.

²²⁸ Jašarević 2017, 11, Pl. 2/7. The grave was the burial of an adult male; the finds included a spear socket and glass beads.

²²⁹ Teržan 1974, 45; 1976, 338, 340, 380, Fig. 30.

²³⁰ Čović 1987a, 262, Pl. XXIX/9; Gavranović 2011a, 203.

²³¹ Božić 1981, 316.

²³² Dizdar 2015, 45–49, Map; 2019, 330, Fig. 2/1; 2020, 207; Soós 2020c, 122–125, Fig. 3.

²³³ Božić 1981, 315–316.

²³⁴ Truhelka 1904, Pl. L/22, 24. The grave also contained an older fibula with a ribbed bow and other costume and jewellery items that correspond to Early La Tène fibulae. The older fibula may have been added to the grave later. On the other hand, it had been recorded that Certosa fibulae of types IIa and V from grave M. Petrović Jr. 9 were found together with a Sanski Most-type fibula, which does not belong to it, as it is younger than the mentioned fibulae from phase 3a-1: Truhelka 1904, 92, Pl. XLIV/9; Čović 1961, Y28/2; Gavranović 2011b, 131, Fig. 164/12. On Zgrade-type fibulae: Popović 1996, 112–114, Fig. 7.

²³⁵ Arsenijević 2019, 207, cat. no. 3.

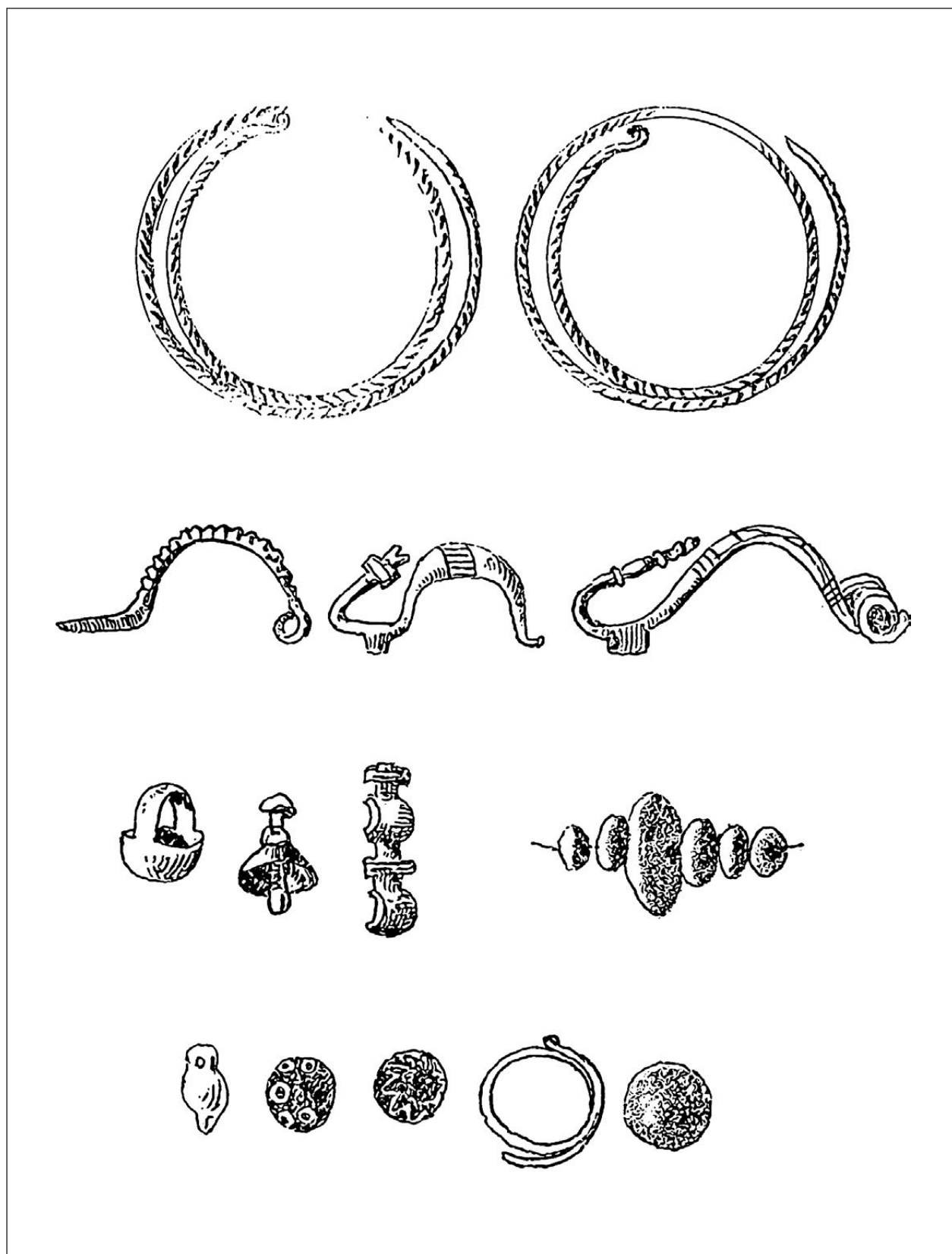


Fig. 12. Grave 43 from the ridge of M. Petrović Jr. at the Donja Dolina cemetery (after: Truhelka 1904)

Сл. 12. Гроб са Греге М. Пејровића мл. на некрополи у Доњој Долини (према: Трухелка 1904)

the grave(s) at Velika, variant D3b temple rings were found together with a large number of Early La Tène fibulae – fourteen in total – along with a Sanski Most-type fibula, indicating that the buried woman was mostly equipped with Early La Tène costume items.²³⁶ At the Dalj–Busija cemetery, grave 87 in Luka Postić's vineyard contained silver temple rings together with a bronze Early La Tène fibula (LT B1) with a knee bow, comparable to examples from Glasinac.²³⁷

Apart from Donja Dolina, the greatest numbers of Early La Tène fibulae (LT B1) have been found at sites in the Danube region, such as Dalj and Osijek, likely originating from destroyed graves that can be dated to the second and third quarters of the 4th century BC. These finds testify to the process of Early La Tène-isation of the final Hallstatt south Pannonian communities, i.e., to contacts between indigenous communities and newcomers, which led to the birth of new identities, characterized by a mixed or hybrid material culture.²³⁸ On the other hand, bronze plate fibulae of the Sanski Most type indicate contacts in the opposite direction – to the Sava River and the western Balkans.²³⁹

Ribbed bracelets

The only types of ring-shaped jewellery analysed here are large bracelets with a ribbed exterior and overlapping terminals (Tab. 3).²⁴⁰ The bracelets come in pairs and were worn on the forearms. A pair of bracelets was found in the cremation grave S. Jakarić 15 (Fig. 3) together with temple rings of variant D1a and two different fibulae. These oval-sectioned bracelets are smooth at the overlapping terminals.²⁴¹ The woman buried in grave M. Petrović Jr. 35 wore bracelets with pronounced ribs on the outside of the whole body (Fig. 5).²⁴² It is also noted that many ribbed bracelets appear at the Sanski Most cemetery, where they remained in use for a longer period.²⁴³ However, those examples have a round body and either closed or slightly separated terminals, which distinguishes them from those found in Donja Dolina.

According to B. Čović, ribbed bracelets with overlapping terminals are a distinctive shape from phase 2c,²⁴⁴ while M. Gavranović dates both graves in which they were found to around the middle of the 6th century BC.²⁴⁵ Likewise, ribbed bracelets at the Donja Dolina cemetery – as representatives of the so-called ribbed style, which can also be seen on certain types of fibulae – are dated by B. Teržan to the serpentine fibula phase, corresponding to the second half of the

6th century BC. She considers them characteristic for the south-eastern Alpine region, where they appear in women's graves, and links the finds from Donja Dolina to influences from Lower Carniola.²⁴⁶ Ribbed bracelets with overlapping terminals are not numerous outside the area of Lower Carniola; their appearance was dated as early as the end of the Stična phase, but they are primarily characteristic of the serpentine fibula phase.²⁴⁷ In a detailed analysis of bracelets from the Magdalenska Gora cemetery, those most similar to the finds from Donja Dolina are defined as type IIIc, with overlapping and tapering terminals, which distinguishes them from those in Donja Dolina. At Magdalenska Gora, these bracelets are the most numerous and were worn by women and children, rarely by men, in whose graves they are found during the Negau helmet horizon. The appearance of ribbed bracelets of type IIIc is dated to the Stična 2 phase, after which they appear in the serpentine fibula phase, when they became a common form of jewellery in Lower Carniola and the so-called ribbed style flourished; they continued to be

²³⁶ Majnarić-Pandžić 1996, 35–37, 45, Fig. 1–2; Popović 1996, 106–107, Fig. 2/11–12; Dizdar, Potrebnica 2002, 113–115, Pl. 1/1–12; 3/6–7; 1/13 Sanski Most type.

²³⁷ Drnić, Rakvin 2025, 172, Fig. 5/13.

²³⁸ Majnarić-Pandžić 1970, Pl. III/5; IV/1–2; V/7; IX/1; XXV/1–2, 7 etc.; 1996, 42, Fig. 6; Popović 1996, 105–112, Fig. 11; Rustoiu 2009; 2012; Soós 2020c, 125–126, Fig. 1/2; 2/1; Drnić, Rakvin 2025.

²³⁹ Majnarić-Pandžić 1996, 35–37; Popović 1996, 122–124, Fig. 5.

²⁴⁰ Some jewellery items found in graves with type C and D temple rings were analysed in a previous article: Dizdar, Kapuran 2021, 193–197. Other jewellery items found in Late Hallstatt graves with the mentioned temple rings (e.g., various pendants and beads) are not addressed here. For these, see: Gavranović 2011a, 233–240; Jašarević 2024, 54–58, Fig. 13, Pl. 1; 2/2–11.

²⁴¹ Truhelka 1904, 108, Pl. LVI/10; Gavranović 2011a, 212, Fig. 209/1; 2011b, 139, Fig. 176/3.

²⁴² Truhelka 1904, 98, Pl. XLVIII/8; Čović 1961, Y27/139–140; Čović 1987a, 252, Pl. XXVIII/2; Gavranović 2011b, 131, Fig. 163/139–140.

²⁴³ Fiala 1899a, Fig. 42, 85, 109, 158, 170; Gavranović 2011a, 212. Such ribbed bracelets with a round body also appear in the north-western Carpathian Basin in the second half of the 6th century and the beginning of the 5th century BC together with fibulae of the Velem Szentvid type: Jerem 1981, 202–203, Pl. I/22. After S. Tecco Hvala for type IIIa: Tecco Hvala 2012, 301, Fig. 111/1.

²⁴⁴ Čović 1987a, 252.

²⁴⁵ Gavranović 2011a, 212, Fig. 209.

²⁴⁶ Teržan 1974, 41, 44; 1987, 19; Gabrovec 1987, 59, Fig. 4/13, Pl. VII/12–13; Dular 2003, 131, Fig. 76/18–19; 77/7–8, 25–26.

²⁴⁷ Grahek 2004, 146, Fig. 38.

worn in the earlier Certosa horizon.²⁴⁸ T. Kemenczei dates ribbed bracelets to Ha C2-D1.²⁴⁹

CONCLUSION

The analysis of temple rings has revealed a long tradition of their use in the southern Carpathian Basin during the 1st millennium BC, with noticeable changes in their forms and manner of wearing over such an extended period. With the social and cultural reconfiguration that began in this region at the end of the first half or the middle of the 7th century BC – most clearly seen in items of female costume and jewellery, that is, in female body decoration – new forms of temple rings appeared in the southern Carpathian Basin. This is currently evidenced by finds from the cemetery at Donja Dolina, which have been subjected to complex archaeological analysis aimed at defining the basic forms of temple rings as well as their chronological and cultural attributes. The research also focused on tracking changes in the fashion of wearing head/hair jewellery, which made it possible to examine different aspects of the social identities of the women who wore and adorned themselves with these items; temple rings, along with other items of costume and jewellery, are viewed as markers of social identity. Such an approach allows for the analysis of female body decoration, demonstrating that these were gender-specific and often age-specific items. Thus, similarly to other analysed forms of temple rings, types C and D most frequently appear in the graves of adult women, and are only rarely found in children's graves (for example, Donja Dolina – N. Šokić II 5, M. Petrović Jr. grave 28, Szentlőrinc grave 9, etc.). A similar conclusion has been reached in the analysis of head/hair jewellery from the cemeteries of the Vekerzug culture.²⁵⁰ Interestingly, temple rings sometimes served as bracelets (for example, in child grave 7 at ridge I. Stipančević, Beremend grave 2, Szentlőrinc child grave 9), although this was likely a secondary use, as they were not particularly suitable for wearing on the arm.

After the prior analysis of temple rings of the Ciumbrud type (type A) and Donja Dolina type (type B), attention was directed to the two remaining types (C and D) with their variants (Fig. 1). Their study was partly facilitated by the realization that certain forms of temple rings, especially those of variant C1, appear together with the already described types (Tab. 1–3), which also indicates their contemporaneity. Likewise, temple rings of some other variants appear together in various combinations within grave contexts. However,

it is noticeable that temple rings of certain variants (D1b, D1c, D3b), which represent the later forms in the Donja Dolina cemetery (Tab. 2), more frequently occur alone, that is, as the only forms present, a pattern confirmed by contemporary finds from other cemeteries.

Given that the history of research on temple rings in the southern Carpathian Basin has been described in detail in the first study,²⁵¹ this discussion highlights the current knowledge regarding temple rings of types C and D and their variants. M. Gavranović also identified them as distinct types, emphasizing that temple rings in Donja Dolina were part of women's head/hair jewellery over several centuries. He notes that those made of copper alloy with one twisted terminal and a ribbed (grooved) body appeared from the end of the 7th and in the early 6th century BC, and continued to be present throughout the 6th century BC alongside serpentine fibulae. Temple rings with a twisted body are the younger form, which appeared from the middle of the 6th century BC, which is also when the smooth-bodied type emerged. Both forms are noted to have persisted during the Certosa fibula horizon and, at the Sanski Most cemetery, even longer.²⁵² Previously, B. Teržan also pointed out that temple rings with a twisted body appeared in graves with serpentine fibulae in the second half of the 6th century BC, and later with Certosa fibulae during the first half of the 5th century BC.²⁵³ The 6th century BC is generally considered the period of the so-called ribbed style, while the appearance of twisting on ring-shaped jewellery is dated to the first half of the 6th century BC, when twisted torcs were still being worn in Donja Dolina.²⁵⁴ B. Čović notes that a new form of temple ring appeared in Donja Dolina during phase 2b, with a ribbed exterior and one terminal bent into a loop.²⁵⁵ Phase 2c is the dating period of smooth temple rings with a twisted terminal, which also occurred in phase 3a-2 at the Sanski Most cemetery. The appearance of bronze temple rings with

²⁴⁸ Tecco Hvala 2012, 301, 304, 307, 309, 351–362, Fig. 111/3, 6.

²⁴⁹ Kemenczei 2004, 92.

²⁵⁰ Kozubová 2018, 13, 39–55; 2019, 146–149.

²⁵¹ Dizdar, Kapuran 2021, 151–152.

²⁵² Gavranović 2011a, 216–217, Fig. 217/2–4.

²⁵³ Teržan 1974, 44–45.

²⁵⁴ Teržan 1974, 40, Fig. 5.

²⁵⁵ Čović 1987a, 246, Pl. XXVI/12. Grave M. Petrović Sen. 16.

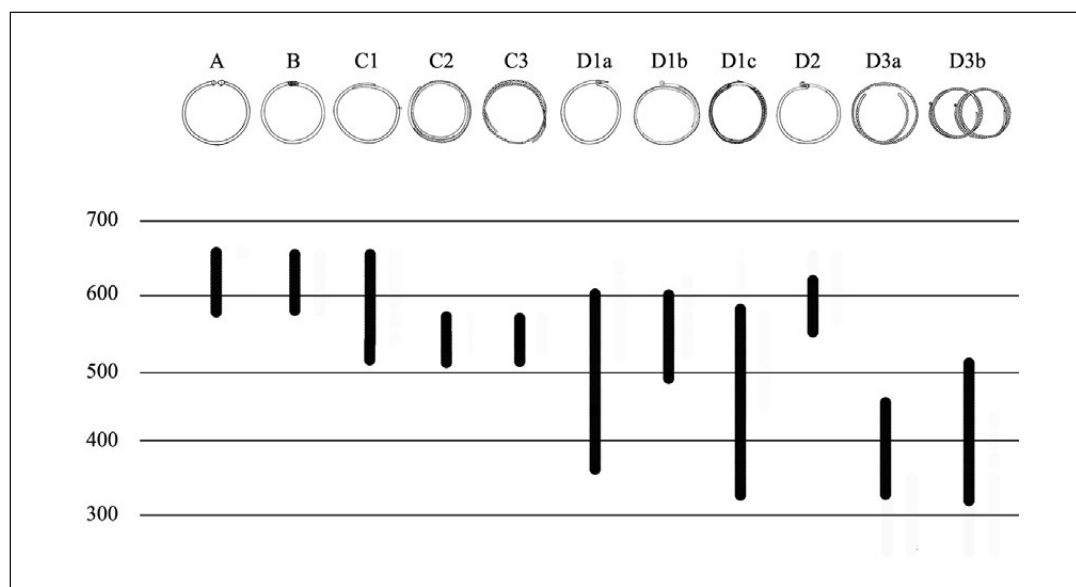


Fig. 13. Types of temple rings in the southern Carpathian Basin (made by: M. Dizdar and A. Kapuran)

Сл. 13. Типови слейоочничарки из јужној дела карпатајске долине (направили: М. Диздар и А. Капуран)

a twisted body is also dated from phase 2c, corresponding to the middle of the 6th century BC, and continuing through the later phases 3a and 3b.²⁵⁶ The same conclusion about twisted temple rings was highlighted in the analysis of the Alsónyék cemetery.²⁵⁷ Silver temple rings of variant D3b, based on finds from Velika and Bogdanovci, were dated by D. Božić to the Čurug phase (corresponding to LT B1), which marks the final phase of the Early Iron Age in the Danube region.²⁵⁸ These temple rings have recently been thoroughly analysed, with conclusions similar to those presented in this study.²⁵⁹

The results of the analysis show that temple rings of variant C1, since they most often appear together with those of type A1 and B (Tab. 3), are dated from the beginning of burials at the Donja Dolina cemetery,²⁶⁰ that is, from the end of the first half of the 7th century BC. For now, they are not known from any other site in the southern Carpathian Basin, which can primarily be attributed to the lack of knowledge about cemeteries from that period. Unlike the two previously described types, these continued to be worn throughout the 6th century BC (Fig. 13) (phase 2c after B. Čović or the serpentine fibula phase). Variants C2 and C3, which are less numerous and, so far, known only from Donja Dolina, are also dated to this phase. They share the body shaping method with temple rings of variants D1b and D1c. As noted, temple rings of variant

C1 are most frequently found together with those of types A1 and B, and were the only form present in just one grave (Fig. 2). They also rarely appear in combination with other variants such as C2 and D1a (Tab. 1). Interestingly, temple rings of variant C1 have been found in two graves at the Ozd–Piscul Deagului cemetery, which, together with those of type A1, would also indicate connectivity between the Ciumbrud group and Donja Dolina. However, at the cemeteries of the Ciumbrud group, the women were always buried with temple rings of the same form, and combinations like those in Donja Dolina do not occur. Rare finds of temple rings of variant D2 are also dated to the end of the 7th century and the beginning of the 6th century BC.

As shown by finds from the graves, temple rings of variants D1a and D1b at the Donja Dolina cemetery appeared at the end of the 7th century and the beginning of the 6th century BC (Tab. 2). These are characterized by one terminal being bent, or hammered and

²⁵⁶ Čović 1987a, 252–253, 256, 258, Fig. 16/4, Pl. XXVII/11–12; XXVIII/12. With a similar conclusion: Jašarević 2024, 51–54; Drnić, Rakvin 2025, 172.

²⁵⁷ Soós 2020a, 77–78.

²⁵⁸ Božić 1981, 315, 324.

²⁵⁹ Drnić, Rakvin 2025, 170–173, Fig. 6.

²⁶⁰ Teržan 1974, 43–45, Fig. 7; Čović 1987a, 238–262; Gavranović 2011a, 263–276; 2011b, 128–139; 2016, 130–133.

bent. They also continued to be worn more frequently throughout the 6th century BC (Fig. 5; 14), and variant D1b perhaps even at the beginning of the 5th century BC. In older examples, one terminal seems to be simply bent and not hammered, which became characteristic for temple rings from the 6th century BC onwards. This would indicate a local development of temple rings with hammered and twisted ends. At the Sanski Most cemetery, temple rings of variant D1a appeared in even later graves as the only form present, which is also the case at the Szentlőrinc cemetery. This shows that it was a simple and long-period form, and currently somewhat more widespread than most others (Map 1). Temple rings of variant D1c at the Donja Dolina cemetery appeared from the serpentine fibula phase (phase 2c) and continued to be used until the end of the Early Iron Age. This dating is also confirmed by finds from Dvorovi, Alsónyék, and Apatin. Temple rings of variant D1c always appear as the only form in the grave (Fig. 6–7), even four or five pairs in some graves, which is similar to how the oldest forms of temple rings were worn. Additionally, temple rings of variant D1b are most often the only type found in graves (Tab. 2). Silver temple rings of variant D3b, which are known from the graves of richly equipped women, were worn in the same way and are dated to the same period (Fig. 9), testifying to the social status of the women, as well as the families who could afford such elaborate burials. This variant, at least for now, shows the widest distribution – from Donja Dolina to Beremend and sites along the Danube (Map 1). It is notable that temple rings of this variant, dated to the very end of the Early Iron Age (Čurug or LT B1 phase), have bodies made of thin silver wire with narrow and fine coils, while the central part is a shorter smooth section. It is important to note that the tradition of wearing silver temple rings with twisted bodies – but significantly smaller in size and in three variants based on the shape of the terminals – continued in graves dated to the beginning of the Late Iron Age (LT B2).²⁶¹ The few temple rings from the Donja Dolina cemetery that correspond to forms known from Vekerzug culture cemeteries (Fig. 10) or from Lower Carniola indicate a complex network of contacts and cultural connectivity – perhaps even women's mobility (matrimonial alliances) – between these areas, as is also documented by the analysis of other items of costume and jewellery.

The analysis of temple rings of types C and D has revealed additional insights. Temple rings of variants C1, C2, and C3 in the southern Carpathian Basin – just



Fig. 14. Woman with body ornaments from grave 35 from the ridge of M. Petrović Jr. at the Donja Dolina cemetery (made by: A. Kapuran)

Сл. 14. Жена са украсима на шелу из гроба 35 са Грече М. Пејровић мл. на некрополи у Доњој Долини (нацртао: А. Капуран)

like those of types A1 and B – are known only from the Donja Dolina cemetery, which continues to serve as the basis for their study. These are older forms characteristic of the period from the end of the first half of the 7th century to the end of the 6th century BC (Fig. 13). In the studied area, there are only a few women's graves from this period in which temple rings were not found. Notably, the nearby Kaptol cemetery in the Požega Basin, which corresponds to the earliest phases of the Donja Dolina cemetery, contains no temple

²⁶¹ Jovanović 1994; 2007; Ljuština, Spasić 2012, 368–370; Rustoiu 2012, 365, Pl. 14/2a–b; Rustoiu, Ursuțiu 2013a, 77–80, Fig. 6; 2013b, 326–327, Fig. 13/2; Rustoiu, Berecki 2014, 253, Pl. 3/2; Rustoiu 2017, 185, 191–192, Fig. 10; Rustoiu, Ferencz 2017, 224, Fig. 7/2; Rustoiu 2022, 54–58, Fig. 8; Drnić, Rakvin 2025, 169. It can be seen that their distribution does not currently overlap with the older bronze and silver twisted-body variants D1c and D3b, which are also larger in size. Those from LT B2 have, so far, been found at sites east of the Danube.

rings at all, even though many similarities can be observed between the two sites in other aspects of material legacy. Conversely, younger temple rings of variants D1a, D1c, and D3b are known from a large number of sites (Map 1), indicating that other women also followed the fashion of the time and that temple rings were integrated into the local visual expression. Interestingly, temple rings of variant D1a are known from only four graves at the nearby Sanski Most cemetery, which is attributed to the same cultural group as Donja Dolina, though bronze two-part temple rings at Sanski Most appear more frequently in phases 3a-2 and 3b.²⁶² Temple rings of variant D1a are rare in the Glasinac area, even though numerous other costume and jewellery items from Donja Dolina point to intensive connections with this region, especially from the middle of the 7th century to the end of the 6th century BC. Given that the number of finds is not large, it remains unclear whether the wearing of temple rings spread from Donja Dolina to neighbouring areas or whether they could have appeared independently of Donja Dolina. It is also notable that the wearing of temple rings in Donja Dolina continued until the end of the Early Iron Age, albeit with certain changes. On the other hand, finds of temple rings in women's graves from the Syrmian group are currently scarce, with the youngest silver variant D3b being the most frequent (Map 1). This would indicate that the decoration of

women's heads/hair with temple rings in the Syrmian group's distribution area was not as prominent in female body decoration, suggesting selectivity in the choice of jewellery. However, Syrmian group sites notably include gold and silver boat-shaped earrings decorated with filigree and granulation techniques, which have been dated to the beginning or first half of the 4th century BC and are considered imports from Macedonian workshops, although the possibility of local production cannot be ruled out.²⁶³ Such earrings have not yet been found west of the Danube region.

The analysis of temple rings of types C and D with their variants from the Donja Dolina cemetery, as well as others in the southern Carpathian Basin, has shown that their use had both gender and age significance (Fig. 14), as was already observed in previous analyses. Additionally, although changes in their forms are evident over time (Fig. 13) – with temple rings of types C and especially D replacing the older types A1 and B – they remained an important part of female body decoration throughout, especially in Donja Dolina (Fig. 14). These are most likely forms of local origin that developed in the southern Carpathian Basin, perhaps specifically in Donja Dolina. Due to their long period and diversity, temple rings were integrated into the visual code of the women who wore them, forming an essential part of their identity and playing an important role in female body decoration.

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²⁶² Fiala 1899a, 115–116; Čović 1987a, 258, 262, Pl. XXVIII/11; XXIX/8; Tessmann 2001, 94–98, Fig. 67–69.

²⁶³ Vinski 1960; Vinski, Vinski-Gasparini 1962, 283, Fig. 114; Vasić 1991; 2001, 26; Potrebica, Dizdar 2014, 155–156, Fig. 18.4.

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ЖЕНСКИ КАСНОХАЛШТАТСКИ УКРАСИ ЗА ГЛАВУ/КОСУ У ЈУЖНОМ ДЕЛУ КАРПАТСКЕ КОТЛИНЕ (II)

Кључне речи. – женски накит за главу/косу, слепоочничарке, старије гвоздено доба, јужни део Карпатске котлине, украшавање женског тела, идентитет, повезаност

У анализи слепоочничарки типа Чимбруд и Доња Долина назначени су просторни и хронолошки оквири јужног дела Карпатске котлине, који је током млађе фазе старијег гвозденог доба обележен хетерогеном материјалном културом која се приписује различитим културним групама. Некрополе нису биле систематски истраживане, односно најчешће се ради о некрополама са тек неколико гробова. Изузетак за сада представљају некрополе у Доњој Долини, које трају све до млађег гвозденог доба, као и некропола Сент-лоринц, која се датује у крај старијег гвозденог доба. Овакво стање истражености утицало је и на познавање материјалне културе која се може датовати од средине 7. па све до почетка млађег гвозденог доба почетком последње трећине 4. века п. н. е. Ипак, захваљујући открићу гробова с предметима женске ношње и накита, могуће је следити развој материјалне оставштине током овако дугог периода, која уједно указује и на смерове и интензитет културне повезаности. Један од таквих облика представљају и налази слепоочничарки, које су биле важан део визуелног идентитета жена које су их носиле. До сада познати налази указују да је на простору јужног дела Карпатске котлине постојала дуга традиција украшавања косе различитим облицима слепоочничарки, што ће се наставити све до краја старијег, па чак и у почетак млађег гвозденог доба.

Као важан елемент у украшавању жена током касног Халштата, слепоочничарке заједно са осталим предметима ношње и накита биле су доминантна ознака у истицању различитих аспеката женских друштвених идентитета. Њихова анализа, заједно с осталим предметима из гробних целина, сведочи да се радило о препознатљивом родно одредивом накиту, који такође може указивати и на друштвени статус жена које су га носиле. Иако за већину гробова недостају резултати антрополошких анализа, прикупљени подаци могу указивати и на постојање старосног концепта, односно у којем су узрасту биле покојнице које су своју косу украшавале различитим слепоочничаркама. Ово су уједно и неки од одговора на постављена истраживачка питања из претходне анализе, а на која ће се настојати одговорити и анализом остала два основна типа слепоочничарки.

У претходној расправи анализиране су слепоочничарке типа Чимбруд (тип А) и Доња Долина (тип Б), које се на гробљу у Доњој Долини често појављују у оквиру истих гробних контекста. Њихова појава, уз остале предмете женске ношње и накита, сведочи о реконфигурацији у украшавању женског тела у јужном делу Карпатске котлине која се десила крајем прве половине и око средине 7. века п. н. е. У

појединим гробовима у Доњој Долини, уз ове слепоочничарке, појављују се и оне других облика, најчешће варијанте Ц1. Предмет анализе су остала два издвојена типа слепоочничарки са варијантама (типови Ц и Д) које су најчешће биле израђене од легура бакара, а ретко од сребра (сл. 1). Препознати типови издвојени су на основу налаза са некрополе у Доњој Долини, који се истичу бројем и разноврсношћу облика слепоочничарки, док налази са осталих локалитета у јужном делу Карпатске котлине представљају допуну њиховом бољем познавању. Будући да се најчешће ради о налазима из скелетних гробова, слично као код слепоочничарки типа А и Б, познат је њихов положај са обе стране главе покојница током више векова њихове употребе, односно да су највероватније коришћене као украси за косу. О томе сведоче и описи скелетно сахрањених покојника За с греде Н. Чегрља и гроба 1 из баште Н. Шокић, у којима су се слепоочничарке налазиле са обе стране главе покојница у висини слепоочница.

На основу налаза у Доњој Долини као и са осталих налазишта у јужном делу Карпатске котлине, слепоочничарке су разврстане на четири основна типа с обзиром на начин на који су обликовани њихови крајеви (сл. 1). Поједини типови још се могу поделити на варијанте према начину обликовања њиховог тела, које може бити: 1) глатко; 2) наребрено са спољашње стране; 3) увијено.

За слепоочничарке типа Ц карактеристично је да имају стањене крајеве, односно да им се тело сужава идући према крајевима. С обзиром на начин обликовања тела издвојене су три варијанте – варијанта Ц1: глатке слепоочничарке; варијанта Ц2: слепоочничарке које су наребрене са спољашње стране; варијанта Ц3: слепоочничарке увијеног тела. Слепоочничарке типа Д имају раскован, мање или више увијен или један (тип Д1) или оба краја (тип Д2). С обзиром на начин обликовања тела, слепоочничарке типа Д1 такође се деле на три варијанте – варијанта Д1а: глатке слепоочничарке; варијанта Д1б: слепоочничарке које су наребрене са спољашње стране; варијанта Д1ц: слепоочничарке увијеног тела. Слепоочничарке типа Д2, са оба раширена и увијена краја, имају глатко тело. Као посебан тип – Д3 – издвојене су сребрне слепоочничарке које се могу поделити у две варијанте – варијанта Д3а: слепоочничарке тордираног тела и благо проширених крајева; варијанта Д3б: слепоочничарке тордираног тела с раскованим и увијеним једним крајем.

Неке од слепоочничарки нису биле у целини сачуване, што је најчешће случај на њиховим крајевима, па је тешко

са сигурношћу одредити о којем се типу и варијанти радило. Такође, приметно је како се слепоочничарке варијанте Ц1 у гробовима у Доњој Долини често јављају са већ анализираним типовима А и Б, док се неки други облици ретко појављују заједно са ова два типа. За хронолошко одређење осталих издвојених типова и варијанти такође су важне гробне целине у којима се појављују са осталим предметима ношње и накита, за које ће се такође извршити типолошко-хронолошка анализа.

Слепоочничарке варијанте Ц1 имају глатко тело, које је најчешће округлог пресека, само у изузетним случајевима овалног, које се сужава према крајевима. Крајеви слепоочничарки из старијих гробова су чешће благо пребачени један преко другог, док су код оних из млађих гробова крајеви више пребачени или им је тело било двоструко тордирано. Слепоочничарке варијанте Ц1 на Доњој Долини само се у једном гробу појављују као једини облик (сл. 2). Најчешће су се носиле у комбинацији са слепоочничаркама типа А1 или нешто ређе у комбинацији с типовима А1 и Б. Такође, веома ретко се јављају у комбинацији и с другим облицима слепоочничарки млађих од оних у којима се налазе заједно са типовима А1 и Б (таб. 1; таб. 3). Слепоочничарке варијанте Ц1 за сада су познате само из Доње Долине, где су забележене у инхумираним гробовима одраслих жена, док се ређе појављују у гробовима кремираних покојница. Приметно је како се налазе у богатије опремљеним гробовима који се истичу бројем осталих предмета ношње и накита (таб. 1) а припадају старијој фази сахрана. Налази слепоочничарки варијанте Ц1 познати су још само из два инхумирана гроба с некрополе Озд – Пишкул Дегулуи, смештене у долини реке Оздули. С друге стране, слепоочничарке варијанти Ц2 и Ц3 не представљају тако бројне налазе (таб. 1). Слепоочничарке варијанте Д1а имају глатко тело округлог пресека. На једном крају се сужавају, док је други раскуцан и увијен. Чини се како слепоочничарке из старијих гробова на Доњој Долини имају благо савијен крај, док је код млађих он дужи и раскуцан а затим увијен. Крајеви могу бити благо или јаче пребачени, ретко су двоструко увијени. У гробовима се најчешће јављају у комбинацијама с другим облицима, увек по једна или две слепоочничарке варијанте Д1а са обе стране главе покојнице, односно носиле су се у пару (таб. 2). Осим на некрополи у Доњој Долини, пронађене су и на другим некрополама (сл. 4), што показује да се ради о једноставном облику и облику више распрострањеном од осталих (карта 1). Слепоочничарке варијанте Д1б имају споља наребрено тело округлог пресека које се с једне стране завршава раскуцаним и увијеним крајем, док се други сужава и завршава у виду глатког шиљка (таб. 2). Слепоочничарке овог облика јављују се као једини тип у већини гробова (сл. 5; таб. 2). На некрополи у Доњој Долини један од бројнијих облика представљају слепоочничарке варијанте Д1ц тордираног тела округлог пресека. Један крај се сужава и завршава у виду глатког шиљка, док је други раскуцан и увијен у виду ушице. У средишњем делу такође се често налазио и глатки део. Слепоочничарке овог облика јављују се као једини облик у свим гробовима (таб. 2). Налазе се у пару (сл. 7), а издвајају се гробови М. Петровић мл. 9 (сл. 6) и 30, у којима је са обе стране главе покојнице било по четири и/или пет слепоочничарки (таб. 2). Слепоочничарке овог облика налазе се у

гробовима одраслих жена који се не издвајају већим бројем осталих предмета ношње и накита. Овакав тип је до сада познат на још три налазишта: Дворови–Крчевине, Апатин–Марковић виногради, Алсоњек гроб 8. На гробљу у Доњој Долини један од слабо заступљених облика представљају слепоочничарке глатког тела округлог пресека и са оба краја увијена у ушицу варијанте Д2.

Као посебан тип (Д3) издвојене су слепоочничарке од сребра са тордираним телом округлог пресека, које, с обзиром на начин обликовања крајева, делимо на две варијанте. Слепоочничарке варијанте Д3а имају благо проширене глатке крајеве, а за сада су познате само из скелетно сахрањеног гроба 1 на некрополи Солине–Сребра недалеко од Тузле (сл. 8). Варијанту Д3б представљају сребрне слепоочничарке са тордираним телом округлог пресека. Један крај је раскуцан и увијен у ушицу, док се други сужава и завршава у виду глатког шиљка. На средишњем делу тела такође се налази глатки неукрашени сегмент, као и код оних израђених од легура бакра. Слепоочничарке ове варијанте су двоструко увијене. Осим у Доњој Долини (сл. 9), слепоочничарке ове варијанте забележене су у гробовима богато опремљених покојница и на некрополама као што су Беремнд, Велика, Богдановци и Даљ (карта 1). На гробљу у Доњој Долини пронађени су још неки облици кружног накита који су могли имати функцију украса за косу, односно слепоочничарки које се могу упоредити са налазима на некрополама културе Векерцуг и на некрополама у Долењској.

За хронолошко дефинисање слепоочничарки типа Ц и Д и њихових варијанти важан део представља типолошко-хронолошка анализа других делова ношње и накита из гробних контекста у којима се оне јављају, што се пре свега односи на некрополу у Доњој Долини (таб. 1–3). Резултати дијахроне анализе сведоче о различитим аспектима женских друштвених идентитета током касног Халштата у јужном делу Карпатске котлине као и успостављеној културној повезаности између суседних, али и удаљених подручја. Некропола у Доњој Долини истиче се интеграцијом облика различитог порекла у оквиру исте гробне целине, чиме настају јединствене хибридне комбинације које су биле важне у истицању визуелног идентитета жена. Резултат представља јединствен начин украшавања женског тела, чији визуелни код одговара заједници која га је и створила. Анализа је олакшана сазнањем како различите варијанте слепоочничарки типа Ц и Д понекад долазе у оквиру истих гробних целина (таб. 3), што указује на исти или блиски временски оквир њиховог ношења (сл. 13).

Анализа слепоочничарки указала је на дугу традицију њиховог ношења у јужном делу Карпатске котлине током 1. миленијума п. н. е., при чему је током овако дугог раздобља приметна промена њихових облика као и начин ношења. С друштвеном и културном реконфигурацијом, која на овом простору започиње крајем прве половине или средином 7. века п. н. е. и за сада се најјасније препознаје у предметима женске ношње и накита, односно у начину украшавања жена, приметна је појава нових облика слепоочничарки у јужном делу Карпатске котлине. О томе за сада сведоче налази са некрополе у Доњој Долини, који су подвргнути комплексној археолошкој анализи ради дефинисања основних облика слепоочничарки, као и њихове хронолошке и културолошке одреднице. Питања су такође била усмерена и на праћење

промена у моди ношења накита за главу/косу, што је омогућило испитивање различитих аспеката друштвених идентитета жена које су их носиле, односно слепоочничарке се, уз остале предмете ношње и накита, посматрају као ознака друштвеног идентитета. Такав приступ показује да се ради о родним, а често и старосним карактеристикама ових предмета. Слепоочничарке типа Ц и Д такође се најчешће јављају у гробовима одраслих жена, док се тек у ретким случајевима јављају у дејим гробовима.

Резултати анализе показују како се слепоочничарке варијанте Ц1, с обзиром на то да се најчешће појављују сатиповима А1 и Б (таб. 3), датују у почетак некрополе Доња Долина, односно од краја прве половине 7. века п. н. е. За сада нису познате ни са једног другог налазишта у јужном делу Карпатске котлине. За разлику од оних типа А и Б, настављају да се носе и током 6. века п. н. е. (сл. 13), истовремено са варијантама Ц2 и Ц3, које нису тако бројне. Са слепоочничаркама варијанти Д1б и Д1ц, оне су сличне у начину обликовања тела. У Доњој Долини се крајем 7. и почетком 6. века п. н. е. појављују и слепоочничарке варијанти Д1а и Д1б (таб. 2). За њих је карактеристично да им је један крај савијен, односно раскуцан и савијен. Оне такође настављају да се носе и током 6. века п. н. е. (сл. 5; 14), а варијанта Д1б можда и на почеку 5. века п. н. е. На некрополи Сански Мост слепоочничарке варијанте Д1а јављају се у још млађим гробовима, и то као једини облик, што показује како се ради о једноставном и дуготрајном типу за сада нешто раширенијем од већине других (карта 1). Оне се јављају као једини облик у гробном контексту (сл. 6–7), а у неким гробовима чак по четири или пет пари, што је слично начину ношења најстаријих облика слепоочничарки. На исти начин су ношене тако да се датују у исто време као и сребрне слепоочничарке варијанте Д3б, које су познате из гробова богато опремљених покојница (сл. 9) које сведоче о њиховом друштвеном положају. Ова варијанта, ба-

рем за сада, показује најширу распрострањеност – од Доње Долине до Беременда и налазишта уз Дунав (карта 1). Слепоочничарке ове варијанте које су датоване на сам крај старијег гвозденог доба (фаза Чуруг или ЛТ Б1) имају тело од танке сребрне жице са уским и финим навојима, док се у средишњем делу налази краћи глатки сегмент. Традиција ношења сребрних слепоочничарки тордираног тела, али битно мањих димензија са три варијанте завршетака, још се може наћи и у гробовима датованим на почетак млађег гвозденог доба (ЛТ Б2). Још се могу споменути малобројни облици слепоочничарки са некрополе у Доњој Долини који припадају облицима какви су познати са некрополе културе Векерцуг (сл. 10) или у Долењској, што би указивало на комплексну мрежу контаката, документовану и анализом других предмета ношње и накита.

Приметно је да у Доњој Долини ношење слепоочничарки траје до краја старијег гвозденог доба, уз одређене промене. С друге стране, у гробовима жена сремске групе налази слепоочничарки за сада су малобројни, при чему су најчешће оне сребрне најмлађе варијанте Д3б (карта 1). Ово би указивало како украшавање главе/косе жена слепоочничаркама на простору распрострањавања сремске групе није било тако истакнуто, односно указивало би на извесну селективност у одабиру накита. Анализа слепоочничарки типа Ц и Д са варијантама показала је да њихово ношење има и родно и старосно значење (сл. 14). Такође, иако су током времена приметне промене у њиховим облицима (сл. 13), односно слепоочничарке типа Ц и посебно Д замениле су оне које припадају старијим типовима А1 и Б, оне све време остају важан аспект украшавања жена. Највероватније се радило о облицима локалног порекла насталим у јужном делу Карпатске котлине, можда управо у Доњој Долини. Због своје дуготрајности и разноликости, слепоочничарке су биле саставни део у визуелног кода жена које су их носиле, односно саставни део њиховог идентитета.

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GRAECO-ROMAN GEMS WITH HARVESTING SCENES

*To Professor Andrew I. Wilson
for his 58th birthday*

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Abstract. – In this paper we discuss harvesting scenes on Graeco-Roman gems, notably the Mediterranean staple harvest crops: cereals, the vintage, and olive oil. Our study material includes gems depicting the ard, with the heads of cereal and glumes. Of particular interest is a gem from south-eastern Turkey with an unusual scene depicting the date harvest, reminiscent of an older theme which had a ritual significance. Apart from an example in the British Museum, there are several gems depicting palm trees that reference the Levant, from whence it is likely the date harvest gems originate, just as an olive harvest gem from Britain surely originates from the Mediterranean region. The paper, therefore, includes depictions of palm trees and their symbolism in the iconography of gems in ancient Egypt, Mesopotamia, Near East, Anatolia, Greece, Rome and the Mediterranean, and references the iconography of their representations on cylinder seals as a possible analogy for related representations on Roman gems. The authors emphasize the differing symbolism of various harvesting scenes and the professional and social status of gem owners as well as the choice of the varieties of gemstone from which particular categories were fashioned.

Keywords. – Date palm, agriculture, harvest, Anatolia, ancient Near East, glyptography, Roman glyptics, Roman period, classical archaeology

Introduction: Gems depicting harvesting scenes

The scenes of agricultural activity, which provided the staple food of the Roman Empire, Anatolia included, are limited compared not only with scenes of animal husbandry, goatherds with their goats and representations of cattle but even hunting scenes, which in many cases, though not all, were leisure pursuits. Fishing with rod and line, like hunting, was doubtless a minor source of food but, as its presence on a gem depicting scenes of villa life suggests, this was more often than not a recreation for the élite.¹ Economic fishing was undertaken then, as now, with the use of nets.

It should be noted that most vintaging scenes depict Eroses harvesting the grapes, rather than peasant labourers. Here, there is a strong connection with the Dionysiac cult (Fig. 1), as Eroses play a significant role in depictions of the thiasus which frequently figure Dionysus, satyrs and Eroses with wine vessels.²

Although such gems may simply indicate veneration for a pre-eminent saviour god, they would also bring the commercial production of wine to mind, as would depictions of wine amphorae.

Scenes featuring the olive harvest, generally with Eroses climbing trees or knocking down the fruit with a stick, are fairly common, though in the latter case the harvest scenes need to be distinguished from similar gems showing Eroses catching birds with birdlime by means of the baited staffs they carry. The date harvest may have been an important one in parts of the Levant but it is rarely portrayed on gems. In this paper we extend especial focus to examples of this rare scene on gems.

¹ Neverov 1976, 76 and 108, no. 125.

² Cf. Laflı, Henig 2023, nos. 1–3 (gems depicting Dionysus), nos. 4–12 (Satyr) as well as nos. 13 and 23 (Eros).



Map 1. Sites in Anatolia to which reference is made in the text (F. H. Kaya, 2025)

Мапа 1. Локалитетни у Анадолији који се помињу у шекстију (Ф. Х. Кая, 2025)

Depictions of cereals being cut with sickles represent the gathering of the essential subsistence crop, produced on an enormous scale in North Africa for the *Annona*, the annual grain supply, tied to the welfare and abundance of the people of Rome, as personified on the Imperial coinage. However, the cereal harvest was, of course, of vital significance throughout the provinces.

A variant of the standard type of a farm labourer harvesting is represented by a magical amulet type employed against back pain that depicts a peasant cutting the cereal crop with back painfully bent, clearly suffering from sciatica.³ These gems appear to be especially prominent in the Levant and should be viewed alongside many representations of heads of cereals depicted by themselves and by the *modius* or corn measure employed to weigh the grains.⁴ Above all, stalks of cereals and poppy heads are depicted clasped in the hands of Demeter, Tyche and other deities. The ubiquity of the goddess Demeter/Ceres who is one of the most frequently depicted deities throughout the Empire, should be noted.⁵

It may be significant that, apart from one example from Novae in Bulgaria,⁶ all of the provenanced examples of the gems depicting an ard (an early simple form of plough without a mould board), an ear of wheat and a glume are from Anatolia.⁷

The date harvest based on an engraved gem from Gaziantep, Turkey

In the Archaeological Museum of Gaziantep in south-eastern Turkey (Map 1) there is an intaglio displaying the harvesting of dates from a palm (acc. no. 1723; Figs 2a–e). This gem, in which the tree is flanked by two human figures, is reminiscent of an established iconography that probably had an ancient, ritual significance. It is a red jasper intaglio (18 x 14 x 2 mm) and depicts two male attendant figures harvesting dates from a date palm tree, most probably of the species *Phoenix dactylifera*, positioned in the middle ground. It was acquired from Mr Halil Özden from Nizip, ancient Nisibis, on 3rd November 1955 for 12.5 TL (\$US 4.4).

In this scene, one of the two figures is a mature male fully dressed in a belted tunic; the other a nude boy, perhaps a slave child? Here, a successful date crop is

³ Amorai-Stark, Hershkovitz 2016, 180–183, nos. 169–171; Faraone 2018, 94–95, pl. 6.

⁴ Zwierlein-Diehl 1991, 120, nos. 2026 and 2028–2029; and Henig 2007, 142, no. 404 and 212 no. App. 201.

⁵ Cf. Laflı, Henig 2026; and Henig 2025.

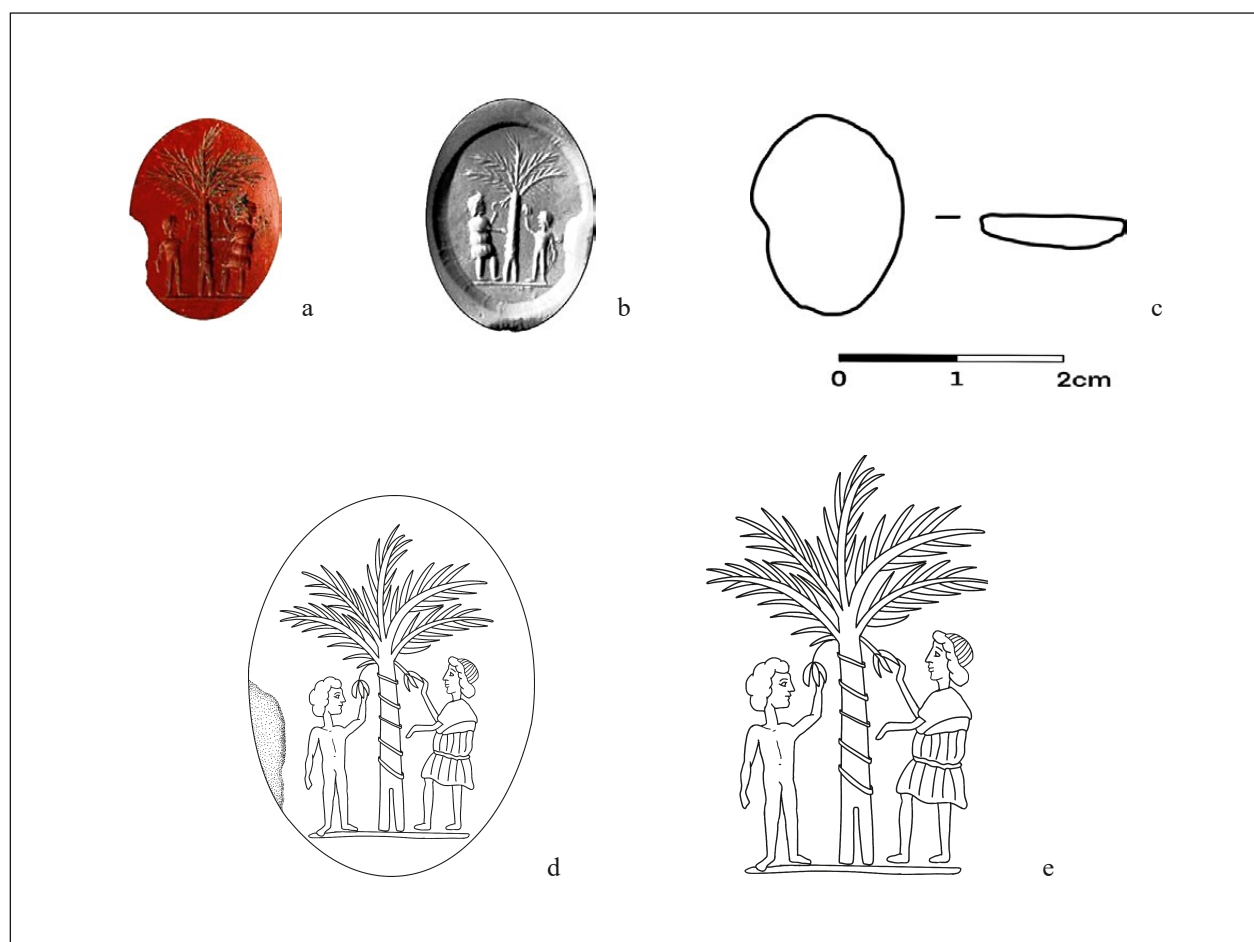
⁶ Dimitrova-Milcheva 1981, 80, no. 231.

⁷ E.g., Laflı, Henig 2026, nos. 8–13.



Fig. 1. Fragment of an ossuary chest with a pair of confronting Erotes holding a bunch of grapes over a crater. Museum of Tarsus, acc. no. 972–33–3 (photo: P. Grunwald, 2006)

Сл. 1. Фрагмент осуаријума са паром Ероса који стоје један наспрам другој и држе грозд изнад крајера. Музеј Тарса, бр. 972–33–3 (фото: П. Грунвалд, 2006)



Figs 2a–e. Intaglio depicting two male figures harvesting dates from a palm tree. Archaeological Museum of Gaziantep, acc. no. 1723 (2a–b after Yınesor Demir 2008, 143, cat. no. 45; 2c–e drawn by L. Özlüoğlu, 2025)

Сл. 2a–e. Интаљо који приказује две мушке фигури које беру урме са палме. Археолошки музеј Газијантјепа, бр. 1723 (2a–б према: Yınesor Demir 2008, 143, кат. бр. 45; 2ц–е, цртеж Л. Озлуолу, 2025)



Fig. 3. Intaglio from Syria depicting a man gathering dates from a palm. The British Museum, London, acc. no. 1895,0620 [after <https://www.britishmuseum.org/collection/object/G_1895-0620-1> (accessed on 1st January 2025)]

Fig. 4. Egyptian amuletic bead depicting a monkey next to a palm, symbolizing the sun god's daily rising. The Walters Art Museum, Baltimore, MD, acc. no. 42.382. Ca. 1300 BC. Measurements 43 x 22 x 9 mm [after <https://commons.m.wikimedia.org/wiki/File:Egyptian_-_Large_Amuletic_Bead_-_Walters_42382_-_Top_View_A.jpg> (accessed on 1st January 2025)]

Сл. 3. Инџијало из Сирије који приказује човека који бере урме са њалме. Британски музеј, Лондон, бр. 1895,0620 [према: <https://www.britishmuseum.org/collection/object/G_1895-0620-1> (приспуњено 1. јануара 2025)]

Сл. 4. Египћанска амулетска њерла која приказује мајмуна њоред њалме, симболизујући свакодневни излазак боја сунца. Музеј уметности Волтерс, Балтимор, Мериленд, бр. 42.382. Око 1300. године пре нове ере. Димензије 43 x 22 x 9 мм [према <https://commons.m.wikimedia.org/wiki/File:Egyptian_-_Large_Amuletic_Bead_-_Walters_42382_-_Top_View_A.jpg> (приспуњено 1. јануара 2025)]

represented on a highly naturalistic date palm tree.⁸ Not only is the tree depicted realistically rather than being stylized, but the rendition of the garments worn by the clothed male on the right is unusually detailed, and is somewhat similar to that of figures performing rituals in the art of the ancient Near East. The five fronds of the palm are broad and evenly spaced. The ends of the leaves are sharply pointed; the fronds themselves have a central vein. The engraver has not only shown the palm leaves schematically, but also the flower heads and the date fruits. The style of engraving is quite early and should be ascribed to Maaskant-Kleibrink's small grooves style of the first cent. AD (ca. 20–90), characterised by the delicate cutting with a fine drill as is evident both on the trunk of the tree and on the tunic of the adult male harvester. The condition is excellent apart from some abrasion on the edges.

The composition, reminiscent of those on ancient Near Eastern and Egyptian figural scenes, is perhaps related to a funerary ritual and commemoration in the Roman East, and may signify ritual or festal participation during the lifetime of a deceased person.⁹ In any

case, such scenes, reflective of daily life in which a date palm is harvested with accompanying human figures, are recorded on coins from the Roman Near East, but only, thus far, on this gem.

A chalcedony intaglio from Syria in the British Museum, iconographically the closest comparandum to the gem in Gaziantep, also depicts a man gingerly climbing a palm to gather dates, secured by a sling

⁸ See Goor 1967, 331, where Midrash, Wayiqra Rabbah (a homiletic midrash to the biblical book of Leviticus) 3, 1 is quoted where it is stated that "The palm tree bears fruit, even so do the righteous bear fruit". Both Mishna and Talmud confirm that the fruit was gathered all at the same time, the harvesters climbing up the trees with ropes and cutting off whole bunches. This ancient narrative provides a possible inspiration for the glyptic depictions of Graeco-Roman date palm harvest scenes.

⁹ So far there are very few systematic studies concerned with scenes on Graeco-Roman engraved gems derived from earlier Near Eastern glyptic iconography, such as a pair of goats browsing, one on each side, of a tree (the 'tree of life' theme) or Hercules fighting the Nemean lion (the Near Eastern hero wrestling with a lion or a monster).

hung around his body (Fig. 3).¹⁰ These two gems stand out as being genuine genre scenes rather than those depicting the vintage or olive harvest, where the harvesters are generally Erotes and, hence, the activities are mythologized.

Ref. Yinesor Demir 2008, 143, cat. no. 45, 196, 198; Laflı, Henig 2024, 119–120, cat. no. 22, figs 22a–d.

The palm tree in the iconography of ancient Near East and Graeco-Roman arts

From the end of the fourth millennium BC, cylinder seals, scarabs, amulets, frescoes, bas-reliefs, mosaics, coins, engraved gems and several other media in ancient Egypt (Fig. 4), Mesopotamia and the Near East, Anatolia, Cyprus, Greece, Rome, North Africa and the rest of the Mediterranean depict palm trees that reflect their symbolic and economic value in these various areas and periods.¹¹ In particular, the date palm tree was a very common, though complex, element in the iconography of almost all the ancient Near Eastern cultures.¹² Even in the Code of Hammurabi (1810–1750 BC) several articles are concerned with the date palm.¹³ In ancient Mesopotamia as well as in Egypt, it may have represented fertility in humans.¹⁴ A probably ritual date harvest, also in connection with an adoration scene, depicting a palm tree with two men climbing the trunk and grasping the date cluster is known from the Zimri-Lim fresco excavated in courtyard 106 of the Amorite Royal Palace at Mari in eastern Syria, which is dated to the 18th cent. BC and held today at the Louvre (acc. no. AO19826; Figs 5a–b).¹⁵ On this fresco, the full date panicles suggest that the harvesting process is depicted here.¹⁶

In ancient Near Eastern glyptics palm trees figured extensively and symbolise the gathering or picking of fruits and plants, sometimes related to their cultivation.¹⁷ The earliest examples of such seals, i.e., Sumerian seals with palm depictions,¹⁸ have been found in Sumerian centres, amongst them Uruk and Susa, as well as in western Iran, Mesopotamia and Syria. Depictions of date palms in the glyptic art of the ancient Near East also appear between the third and first millennia BC, predominantly on cylinder seals: the date harvest is featured on seals of the Akkadian,¹⁹ Middle Assyrian,²⁰ Babylonian²¹ and Achaemenid²² periods. A remarkable example of an Akkadian cylinder seal held in the Pushkin State Museum of Fine Arts in Moscow (no. 21), on which two men climb the palm in order to harvest the date clusters, is associated with the Mesopotamian warrior goddess Ishtar who is approached by two

votaries, and it seems to be an ancient Near Eastern prototype for our Roman intaglio from Gaziantep in Turkey (Figs 6a–b).²³ Fruiting palms appear on cylinder

¹⁰ Walters 1926, 225, no. 2174, pl. 26, fig. 2174. Acc. no. 1895.0620.1. Measurements 18 x 13 mm. In the tree is a bird; above is a crescent. In the field below, are three crocodiles (?), which might suggest a Nilotic ambience.

¹¹ For the history of date palm trees and their iconography in ancient Iraq, cf. Postgate 1980; and in ancient Iran, cf. <<https://porfiro.co/dates-in-iran-the-story-of-their-origin-and-history-in/>> (accessed on 1st January 2025). One of the most interesting finds related to palm trees and dates in the ancient Near East is the diadem of Queen Puabi of Ur, which has items of gold sewn onto it in a spadix shape with a carnelian date, in the form of a male inflorescence and apple shaped pieces, cf. Ziffer 2010, 423, note 67.

¹² For the scientific definition of date palm trees in contemporary botanics and their biogeography, cf. Chao, Krueger 2007 and Rivera et al. 2018, 199–200. For the archaeology of date palm trees in different geographies, cf. various useful papers in Tengberg et al. 2013.

¹³ For the date palm and its by-products according to cuneiform sources, cf. Landsberger 1967.

¹⁴ Cf. Volk 2005 (generally in the ancient Near East); Hünemörder 2000 (in the Classical world); Ziffer 2010 (for ancient Near Eastern tree goddesses); Danthine 1937 (iconography of date palm trees); Wallert 1962 (in ancient Egypt); Michel-Dansac 2011; Michel-Dansac, Caubet 2013 (in the entire Mediterranean); Miller 1979 (in ancient Greece); Marinatos 1984 (in Minoan Aegean) and Omran 2015 (in ancient and Graeco-Roman Egypt).

¹⁵ Parrot 1937, 336–346, pl. 39; Metzger 1983, 74, fig. 21; and Ziffer 2010, 417–418, fig. 10. Even today, in the Middle East and Egypt one can observe men climbing palm trees using harnesses.

¹⁶ Metzger 1983, 74, note 67.

¹⁷ For example, e.g., Metzger 1983, 71, note 60, 90, note 120.

¹⁸ An example is held at the Los Angeles County Museum of Art, acc. no. M.76.174.318, cf. <https://commons.m.wikimedia.org/wiki/File:Cylinder_Seal_LACMA_M.76.174.318.jpg> (accessed on 1st January 2025). For a fake Uruk cylinder seal from the Natsvlishvili Family Collection in Tbilisi, Georgia, presenting a hound (or panther), fish and a palm tree, cf. Gołyźniak 2022, 171, cat. no. 156.

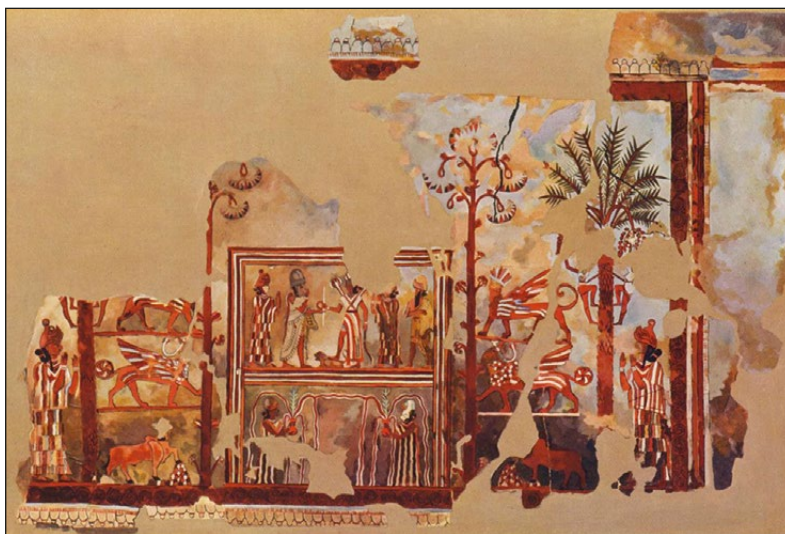
¹⁹ The first representations of sacred gardens can be identified with scenes of date harvests in ritual contexts on cylinder seals of the Akkadian period from the 23rd cent. BC, cf. Boehmer 1965, 125, 191, figs 708–710; and Gábor 2018, 885–886, note 144, fig. 14.1.

²⁰ Gábor 2018, 886, fig. 14.2 (13th cent. BC).

²¹ Collon 1995, 72–74. Moreover, Collon 2001, 128 identifies the palm tree as a toponomic symbol of Babylonia.

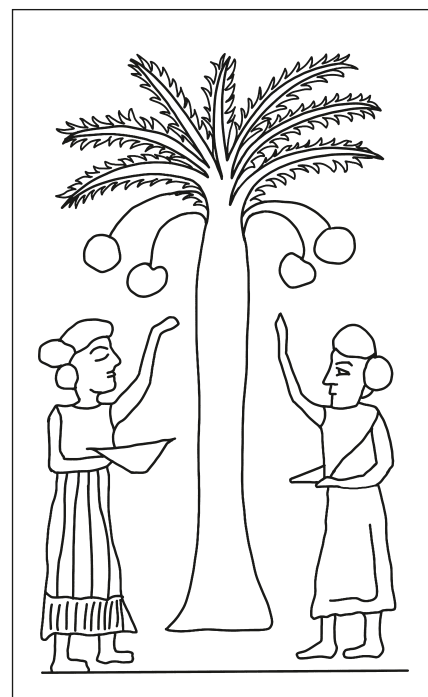
²² Gábor 2018, 870, fig. 4.3.

²³ Metzger 1983, 72, fig. 17a, 76, note 72; Boehmer 1965, no. 383; and Ziffer 2010, 418, fig. 16, note 34. The date and date palm are clearly characteristic of Ishtar, as the date harvest is obviously linked to her on the Akkadian cylinder seals. The name of the goddess Inanna (or Innin; i.e., Ishtar) has been interpreted as ‘ruler of the date palm’. Metzger 1983 in his caption to fig. 17a interprets the date gathering as a ritual harvest of dates. If indeed date gathering preceded or accompanied the investiture of the king at Mari, it may be concluded that the ceremony took place in September–October, the time of the date harvest and the autumnal equinox.



Figs 5a–b. A probable ritual date harvest scene from the Zimri-Lim fresco located in courtyard 106 of the Amorite Royal Palace at Mari, eastern Syria. Musée du Louvre, Paris, acc. no. AO19826 (after Parrot 1937, 336, pl. 39)

Сл. 5а–б. Вероватно ритуална сцена брања урми са фреске Зимри-Лим, која се налази у дворишту 106 аморијске краљевске палате у Марију, источна Сирија. Музеј Лувр, Париз, бр. АО19826 (према: Parrot 1937, 336, pl. 39)



Figs 6a–b. Akkadian cylinder seal depicting ritual date harvest on the left and an introductory scene before Ishtar on the right. Pushkin State Museum of Fine Arts in Moscow, no. 21 (after Metzger 1983, 72, fig. 17a; and Ziffer 2010, 423, fig. 16; 6b drawn by L. Özliüoğlu, 2025)

Сл. 6а–б. Акадски цилиндрични печат који приказује ритуално брање урми са леве стране и уводну сцену пред Иштар са десне стране. Државни музеј ликовних уметности Пушкин у Москви, бр. 21 (према: Metzger 1983, 72, fig. 17a; и Ziffer 2010, 423, fig. 16; 6b, цртеж Л. Озлуолу, 2025)



Fig. 7. Bronze coin from Judea depicting a date palm on the obverse and a bunch of grapes on the reverse, struck in year one of the Bar Kochba (Shimon bar Koseba) revolt, AD 132–133. Inscribed on the obverse in palaeo-Hebrew retrograde, “Eleazar the Priest” and on the reverse “Year one of the Redemption of Israel”. The Walters Art Museum, Baltimore, MD, acc. no. 59.803. Creative Commons

Сл. 7. Бронзани новчић из Јудеје са приказом урмине ђалме на аверсу и грозда на реверсу, искован у првој години устјанка Бар Кохбе (Шимон бар Косеба), 132–133. године. На аверсу је на ђалеохебрејском обрнуто исписано „Елеазар Свешћеник”, а на реверсу „Година прва искуђења Израела”. Музеј уметности Волтерс, Балтимор, Мериленд, бр. 59.803. Creative Commons

seals in the Near East in the first millennium BC as symbols of fertility.²⁴

Phoenix dactylifera, i.e., the Judean date palm,²⁵ is positively described in ancient sources from the Graeco-Roman East for the quality, size and medicinal properties of its fruit, but has since been lost for centuries. Well-adapted to desert climates, the date palm provided one of the few sweeteners (besides honey) in the ancient world before sugar cane was introduced from India. Iconographically, it was represented on coins from 485 BC until AD 1189.²⁶ In Jewish tradition, the palm tree was an important symbol in the Sukkot festival of the ingathering, or autumn harvest. This tree was considered ‘the tree of the life’ in Jewish numismatics and art; therefore, the date palm was especially an emblem of Judea and a few cities in the East (Fig. 7). It appears on the procuratorial coins of Roman Judea minted by the prefects and procurators of this province between AD 6 and 66; e.g., on the coins of the fourth year of the First Revolt (AD 69–70), on the coins of the Flavian era in AD 69–96 (with the inscriptions *Judaea Devicta*²⁷ and *Judaea Capta*²⁸) and on the coins of the Bar Kochba revolt in AD 132–135,²⁹ usually bearing two prominent clusters of dates, but without accompanying figures.³⁰ In the Near East the palm tree continued to be regularly displayed on mosaics and artefacts into the Late Roman–Early Byzantine

period. Neither on the coins nor on any other media of the Roman period, was the date palm tree shown with two accompanying persons as on the gem from Gaziantep; but in Roman Asia Minor, especially in commemorative sculpture, there are scenes with trees and two accompanying male figures (Figs 8a–b).

²⁴ Collon 1987, 129–130, no. 558; 166–167, no. 773.

²⁵ For the Judean date palm, cf. Sallon et al. 2020. Also linguistically, the relationship between the dates and the date palm (‘palmier dattier’ in French) is obvious: in Arabic نخل (nakhl), Hebrew בלול (lulav), Jewish literary Aramaic תמר (tamrā) or תמרה (tumrā), Greek φοῖνιξ (phoenix) as well as Latin palma denote both the tree and its fruit; but, phoenix in Greek can refer to both the colour purple and to the date palm.

²⁶ On Graeco-Roman coins recognizable trees often seen include the olive, the laurel, the fir, the plane tree, the fig, the oak, and especially the date palm. For a detailed survey of date palm trees on Graeco-Roman coins, cf. Rivera et al. 2018, 205, fig. 5, 211, fig. 9.

²⁷ For *Judaea Devicta* issue of Vespasian, cf. *R/C* II, 49, no. 289.

²⁸ Cf. Nussbaum 2021; and Goor 1967, 331, fig. 8. On Dembski 2005, 141, no. 900, pl. 93 there is a fruiting palm with an eagle standing on each side, which might be another *Judaea Capta* theme, this time on an engraved gem from Carnuntum.

²⁹ Cf. Fine 2005; id. 1989, 105ff; and Mazar 2011, 276, no. 10, note 244.

³⁰ Anson 1912, 37–44, nos. 370–441. No. 440 shows two palms, the reverse of no. 441 has three palms with one root.



Figs 8a–b. Marble votive altar (*bomos*) dedicated to Zeus Dionysus by the members of the cult of Neobacchoi, designating newly initiated Dionysiac *mystai*, from the village of Koroseanos (Κοροσεανοί) in the area of Dorylaeum, modern Avdan, 30 km south of Eskişehir. Inscription: Μύσται Κοροσεανοὶ νεόβακχοι ὑπὲρ ἑαυτῶν καὶ κόμης Διὶ Διονύσῳ εὐχὴν. On side ‘C’ a male member of Neobacchoi wearing tunic in the left storage area, holds an emerging tree of life in his left hand, onto which a serpent is climbing. Among the tree’s branches a small-sized cult member (child, youth or slave?) is depicted. Eti Archaeological Museum, Eskişehir (after Haspels, 1971, 638, no. 144)

Сл. 8а–б. Мермерни воџивни олтѣар (бомос) који су њриѣадници култѣа Необаха њосвеѣили Зевсу Дионису, обележавајуѣи нове дионизијске мисѣе који су њрошли иницијацију, из села Коросеанос (Κοροσεανοί) у областѣи Дорилеј, савремени Авдан, 30 km јужно од Ескишехир. Наѣѣпис: Μύσται Κοροσεανοὶ νεόβακχοι ὑπὲρ ἑαυτῶν καὶ κόμης Διὶ Διονύσῳ εὐχὴν. На сѣирани „Ц“, њриѣадник Необаха који носи ѣунику у левој зони за оглаѣање, у левој руци држи сѣабло живоѣа које израсѣа, а уз које се ѣење змија. Међу ѣранама дрвеѣа ѣриказан је мали члан култѣа (геѣе, младић или роб?). Археолошки музеј Еѣи, Ескишехир (ѣрема Haspels, 1971, 638, no. 144)

In the Roman period, dates were exported far from these desert regions to Britannia; indeed, charred remains of dates have been found as far away as the destruction layer in the nascent Colonia at Colchester (Colonia Victricensis) in Britain burnt down in the Boudican revolt of ca. AD 60–61.³¹

In Graeco-Roman iconography only a few palm trees appear within various compositions on gemstones:³² Amongst other examples of gems depicting a palm is a chalcedony magical amulet in the Lewis Collection, Corpus Christi College, Cambridge, whose obverse features a fruiting palm, flanked on each side by a lion.³³ However, in most of these representations palm trees were not the main subject; they are rather a part of compositions. An exception is a palm tree depicted on a chrome chalcedony intaglio that was excavat-

ed in a late first cent.-AD deposit (ca. AD 85–100/110) in the fortress baths of Legio II Augusta at Caerleon, UK. As J. David Zienkiewicz writes, “this gem stone may be a souvenir of a legionary’s term of service under Vespasian”.³⁴ According to Eliat Mazar, gemstones

³¹ Lyons 2018, 374.

³² E.g., Sena Chiesa 1966, no. 1414; Zienkiewicz 1986, no. 25; Guiraud, Roulière-Lambert 1995, 382, fig. 20. Furthermore, for a terracotta bulla from Doliche in south-eastern Turkey in which a shield appears to be attached to a palm tree, cf. Maaskant-Kleibrink 1971, 30; and for the palm branch as an attribute of Tyche on engraved gems, cf. Mussche 1955.

³³ Henig 1975, 62, no. 259.

³⁴ Zienkiewicz 1986, 132, no. 25. It is kept in the Amgueddfa Cymru – National Museum of Wales, Cardiff, acc. no. 81.79H/4.25. H., 10 mm, Wg., 0.2 gr.

with pastoral patterns or sacro-idealistic scenes were produced in the Flavian period in AD 69–96, when there was an increase in the importance of agriculture, as can be seen on the imperial coinage.³⁵

Gems depicting the production of cereals

Intensive agriculture depended on turning the soil, usually by means of an ard drawn by a team of oxen, which the ploughman controlled by means of a goad, as is shown on a carnelian in Vienna.³⁶ A similar scene is depicted on a red jasper in Oxford, where the ploughman holds a head of cereal by its stalk, while a hulled seed (glume) is depicted below the ground line.³⁷ Other gems show an ard, an ear of cereal and a hulled seed. Most of these are from Turkey and it is almost certain that they emanate from the same Anatolian workshop. One example, a red jasper set in an iron ring, is also in the collection of the Ashmolean Museum of Art and Archaeology, Oxford to which it was donated by Mr James Collins with the information that it had been found in Turkey.³⁸ It was noted that the gem was virtually identical to a red jasper in the Erimtan Museum of Art and Archaeology in Ankara and its crisp cutting and the form of the ring dates it most probably to the first cent. AD.³⁹ The late Dr Peter Reynolds identified the cereal species as barley (*Hordeum* sp.) and probably six-rowed barley (*Hordeum hexastichum*) rather than a type of wheat (*Triticum*).

We noted that: “The gem clearly shows many of the features of the ard memorably described by Virgil in the first book of the *Georgics* (lines 169–175), notably the overlapping and jointed elm beam (*buris*) and pole (*temo*), as well as the share-beam (*dentalia*) and the ‘two ears’ (*binæ aures*) for shaping the furrow (and which have, in the past, often been misunderstood as mould-boards) and the handle (*stiva*) of beech. However, the limewood yoke also mentioned by Virgil is not shown”.⁴⁰

Very similar are two other red jaspers from Turkey, the latest of which is from Mezar near Nizib-Nisibis in south-eastern Turkey (Figs 9–10).⁴¹ Another example, a carnelian, from Novae in Bulgaria, is identical as well.⁴² Somewhat earlier, dated to the first cent. BC, are a glass intaglio in the Kunsthistorisches Museum in Vienna depicting an ard together with heads of cereal,⁴³ and a carnelian from Bosnia, once belonging to Arthur Evans and now in a private collection, which shows an ard and a head of cereal, though both of these omit the hulled seed.⁴⁴ There is also a black jasper intaglio in the British Museum figuring a cereal

glume accompanied by two ants, i.e., insect familiars of Demeter.⁴⁵

By featuring both the grown crop and the seed, all the above intaglios anticipate the harvest. Other gems portray the physical harvesting of the crop, showing men reaping with sickles.⁴⁶ In a few instances, the harvester is portrayed, adopting a half-kneeling posture (Fig. 11).⁴⁷ Reaping was back-breaking work and, thus, it is not surprising that a class of magical amulets, mostly of haematite, was produced in the Levant that figure a man, his back uncomfortably bent, cutting the crop in the same manner as the countrymen on the regular gems. These gems commonly bear an inscription on the reverse, CXIWN, a shortened form of ICXIWN, or similar, meaning “for the hips”. Presumably these gems were charms against sciatica.⁴⁸

In Roman iconography the most common objects symbolizing prosperity were plates of fruit, clusters of grapes and ears of wheat. As mentioned above, cereals would have been harvested throughout the Empire and are shown on numerous gems standing in vessels of various types including the modius or corn measure⁴⁹

³⁵ Mazar 2011, 294, note 54.

³⁶ Zwierlein-Diehl 1973, 110, no. 302.

³⁷ Henig, MacGregor 2004, 78, no. 7.18.

³⁸ Henig, Collins 2001 = Henig, MacGregor 2004, 114, no. 11.4

³⁹ Konuk, Arslan 2000, 163, no. 139.

⁴⁰ Henig, Collins 2001, 307.

⁴¹ Laflı, Henig 2024, 108, 111, cat. nos. 7–8, 110, figs 7–8.

⁴² Dimitrova-Milcheva 1981, 80, no. 231.

⁴³ Zwierlein-Diehl 1979, 87, no. 948.

⁴⁴ Hoey Middleton 1991, 137, no. 265.

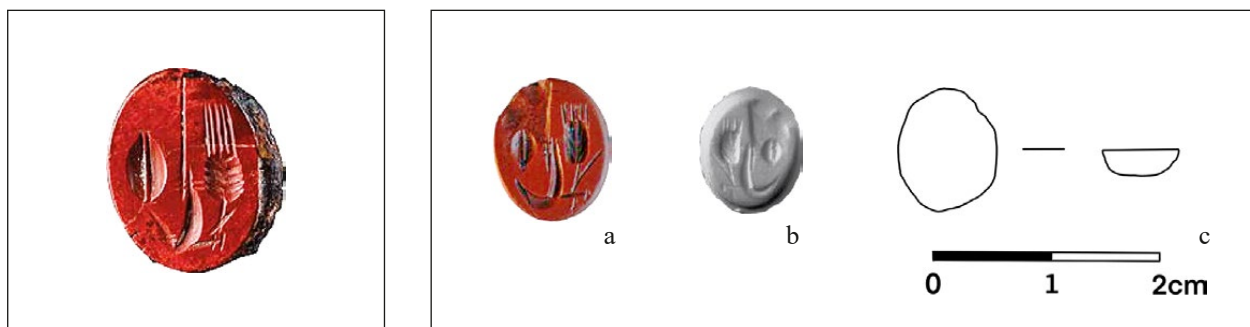
⁴⁵ Walters 1926, 253, no. 2561 <https://www.britishmuseum.org/collection/object/H_OA-9718> (accessed on 1st January 2025).

⁴⁶ In most cases the harvester stands, see Henig 2007, 156, no. 505 = Henig, MacGregor 2004, 78, no. 7.19 from near Shrewsbury, Shropshire (perhaps, therefore, Viroconium, Wroxeter), UK; Guiraud 1988, 158–159, no. 604 from Azille, La Magdaleine, Aude, France; Dembski 2005, 114–115, nos. 618–620 from Carnuntum; Kaić 2024, 140–141, no. 240 from Sisak, Siscia; and from some unrecorded sites, Walters 1926, 225, no. 2166; Maaskant-Kleibrink 1978, 322, no. 966; Brandt et al. 1972, 30, no. 227; Vitellozzi 2010, 310, no. 361.

⁴⁷ Platz-Horster 1987, 115–116, no. 203, a red jasper from Xanten; Giocco et al. 2023, 25, SF 518, a nicolo from the Severan period bath-house drain at Stanwix, Carlisle.

⁴⁸ Hamburger 1968, 34, no. 123; Amori-Stark, Hershkovitz 2016, 180–182, nos. 169–171 from Caesarea, Israel; and Michel 2001, 265–268, nos. 425–429.

⁴⁹ Dembski 2005, 155, nos. 1039–1041; Henig 2007, 142, no. 404 and 212, no. App. 201; Maaskant-Kleibrink 1986, 38–39, no. 79.



Figs 9–10. Two intaglios depicting an ear of cereal, an ard and a glume or glumette from Turkey:
9) The Research Museum of Mr Hâluk Perk, Avcılar, Istanbul (after Gülbay 2017, cat. no. 15, fig. 15);
10a–c) Archaeological Museum of Gaziantep, acc. no. 17.1.87 (after Yinesor Demir 2008, 176, cat. no. 78)

Сл. 9–10. Два интјала која приказују клас житја, рало и њеву или њевуцу из Турске:
9) Истраживачки музеј јосјодина Халука Перка, Авџилар, Истјанбул (према Gülbay 2017, cat. no. 15, fig. 15);
10a–ц) Археолошки музеј Газиантјеја, бр. 17.1.87 (према: Yinesor Demir 2008, 176, cat. no. 78)



Fig. 11. A magical Levantine amulet, almost certainly haematite, depicting a man reaping, i.e., a harvester, and inscribed CXIWN on the back [similar to another haematite gem at the British Museum, London, acc. no. 1867,0915.73 (G 227, EA 56227)]

Сл. 11. Мајична левантјска амајлија, јошјово сигурно хемајитј, са приказом човека који жње, њј. жетјеоца, и нађијисом CXIWN на њолеђини [слично друјом хемајитјском грађуљу у Бриђанском музеју у Лондону, бр. 1867,0915.73 (G 227, EA 56227)]

as well as ears of wheat or barley and the seeding heads of poppies, which are held by the Goddess Demeter herself or by Tyche⁵⁰ who, in that case, is syncretised with Demeter. One especially poignant nicolo intaglio in Nijmegen depicts a hand clasping a cereal ear between thumb and fore-finger, surely a very personal prayer for a successful harvest.⁵¹

A few gems show ears of wheat standing on a throne, symbolically representing the goddess Demeter herself, and possibly reflective of a harvest celebration at which cereal heads on their stalks were enthroned in thanksgiving just as sheafs of wheat are traditionally displayed at harvest festivals in present-day Europe.⁵²

Gems depicting the olive harvest

One of the most interesting gems depicting the harvesting of olives was a red jasper found at St Albans in the near neighbourhood of the Roman *municipium* of Verulamium in Hertfordshire, UK.⁵³ It depicts Eros, who has climbed into a tree which, as it is depicted with a gnarled and twisted trunk, is clearly an olive tree. He

picks the fruit, while below him Aphrodite is working an olive crusher (*trapetum*). Other intaglios show Erotes climbing olive trees to pick olives, including a red jasper in Berlin⁵⁴ and a bloodstone (heliotrope) in Copenhagen.⁵⁵ The other method employed was to beat the tree with a long pole in order to knock down the fruit, which seems to be the case on several gems, amongst them a red jasper and a chrome chalcedony in Aquileia⁵⁶ and a red jasper from Heddernheim (ancient Nida), near Frankfurt am Main.⁵⁷ It should, however, be pointed out that in other cases where Eros is reaching a

⁵⁰ For the sheaf of ears of corn as an attribute of Tyche on engraved gems, cf. Mussche 1955.

⁵¹ Maaskant-Kleibrink 1986, 58–59, no. 116.

⁵² Brandt 1972, 45, no. 2370, pl. 212 with five ears; Nicholls 1983, 17 no. 39 with two ears.

⁵³ Henig 1978 = Henig 2007, 206, no App. 133.

⁵⁴ Furtwängler 1896, 310, no. 8467.

⁵⁵ Fossing 1929, 234, no. 1735.

⁵⁶ Sena Chiesa 1966, 170, nos. 301–302.

⁵⁷ Krug 1975, 117, no. 2.



Figs 12–13. Two intaglios depicting Dionysus pouring his panther wine from a cantharus:
12) Archaeological Museum of Izmir, acc. no. 013.591 (photo: E. Laflı, 2010),
13) A carnelian from the Museum of Anatolian Civilizations, Ankara (photo: E. Laflı, 2004)

Сл. 12–13. Два инџаља која приказују Диониса како свом њаниџеру сипа вино из кантиароса:
12) Археолошки музеј Измира, бр. 013.591 (фото: Е. Лафли, 2010),
13) Карнеол из Музеја анадолских цивилизација, Анкара (фото: Е. Лафли, 2004)

pole up into the branch of a tree, he has limed it and is aiming it to catch a bird.⁵⁸

According to classical sources, slave children were employed in the olive harvest, but this practice has not yet been seen documented on gems.⁵⁹

Vintaging scenes on gems

Wine was of central importance to ancient Greek and Near Eastern society from early times, and in Classical, Hellenistic and Roman times it was under the patronage of Dionysus (Bacchus), who is frequently shown on gems and in other media pouring wine for his panther (Figs 12–13).⁶⁰ His followers, the satyrs and maenads, often joined by Erotes are also shown vintaging, holding bunches of grapes or pouring wine. While the materials used for gems depicting Dionysus and his *thiasus* varied, amethyst was sometimes chosen as representing the colour of dark wine and as a specific against inebriation. Scenes of vintaging regularly depict Erotes, often using ladders in order to reach the top of the vine, as on red jaspers from Aquileia,⁶¹ from Vrlika in the Upper Cetina Valley,⁶² a bloodstone from Salona⁶³ and carnelians from Carnuntum,⁶⁴ from Athens⁶⁵ and from Epidaurum.⁶⁶ Many such examples of gems depicting the vintage are also curated, unprovenanced, in the major European collections.⁶⁷ Often vines are depicted as freestanding, although given broad, twisted trunks as though they were free-standing trees of some size. The confusion may have arisen because vines were wedded to trees, a traditional form

of viticulture still practiced in parts of Italy, and this may be shown on a fragmentary carnelian in the Heinrich Dressel Collection.⁶⁸ So far, we have not located an intaglio in our sample depicting a fruiting vine, although we show a stone relief from ancient Bithynia in the Museum of Bolu (Figs 14a–c) and a red jasper intaglio from the far end of the Empire, excavated at the Roman fort of High Rochester, Northumberland, UK, probably from the fort annexe (Fig. 15), depicting a small cupid (Eros) figure sitting on a branch of a vine

⁵⁸ Sena Chiesa 1966, 171, no. 303; Hamburger 1968, 32, no. 96.

⁵⁹ Palladius, *Op. agr.* I 6, 14; P. Fayum 102. A fourth-cent. AD mosaic curated in the Bardo National Museum in Tunis shows the activities in a large African farm owned by a proprietor called Julius: children beat the olive trees with sticks in order to collect the olive harvest. Yacoub 1978, 187–197 situates this mosaic in Carthage and presumes that the small figures are indeed children. For children in similar labour situations (olive harvest), cf. Petermandl 1997, 117–119 who also offers parallels from later periods. The authors of this paper, however, do not know of any similar scenes on engraved gems.

⁶⁰ Laflı, Henig 2023, 300–301, nos. 1–2.

⁶¹ Sena Chiesa 1966, no. 300 = Richter 1971, no. 152.

⁶² Hoey Middleton 1991, 63 no. 74.

⁶³ Hoey Middleton 1991, 63, no. 72.

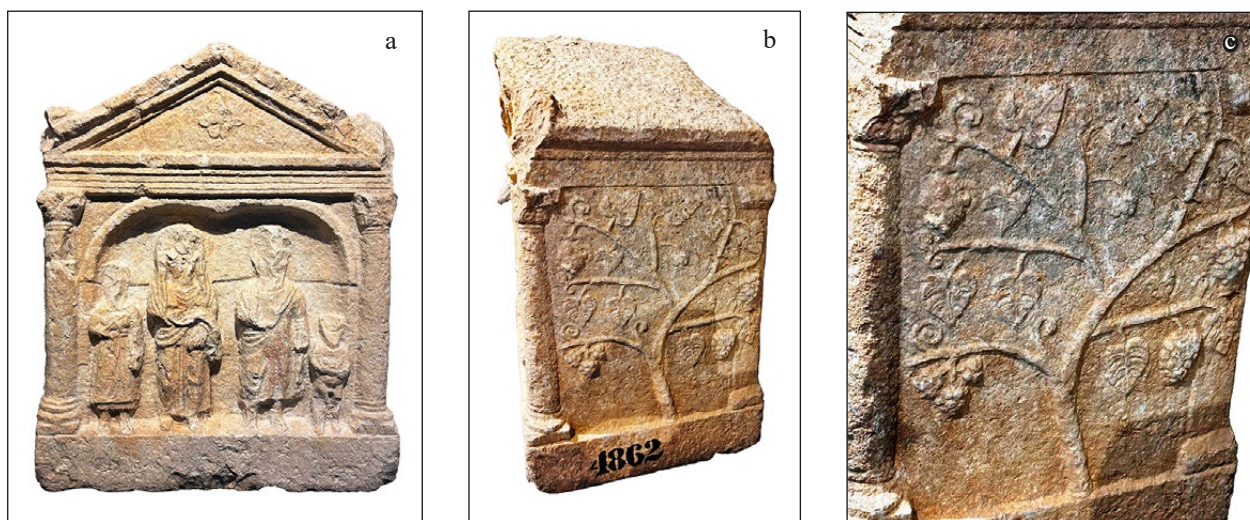
⁶⁴ Dembski 2005, 78–79, no. 260.

⁶⁵ Richter 1971, no. 151.

⁶⁶ Hoey Middleton 1991, 63, no. 73.

⁶⁷ E.g., Zazoff et al. 1975, 171, nos. 845–847; Weiss 2007, 143, no. 71; Maaskant-Kleibrink 1978, 215–216, no. 508.

⁶⁸ Weiss 2005, 144, no. 72.



Figs 14a–c. Funerary tombstone from Bithynia depicting a fruiting vine on its left side. Second cent. AD, Museum of Bolu, acc. no. 4862 (photo: by E. Laflı, 2025)

Сл. 14а–ц. Надгробни споменик из Битиније са приказом лозе са плодом на левој страни. Други век нове ере, Музеј Болу, бр. 4862 (фото: Е. Лафли, 2025)



Fig. 15. Red jasper intaglio from the probable annexe of the Roman fort at High Rochester, Northumberland, UK depicting Eros vintaging in a vine (photo by Richard Carlton, 2025)

Fig. 16. Chalcedony scaraboid intaglio set in a simple gold swivel ring, depicting a nude woman performing her ablutions, kneeling and holding an amphora above her head with both hands. Excavated in the eastern cemetery of Halicarnassus. Fifth-fourth cent. BC, Museum of Nautical Archaeology, Bodrum (photo: E. Laflı, 2025)

Fig. 17. Veined agate intaglio featuring elderly, bearded satyr with a wine vessel. Archaeological Museum of Izmir, acc. no. 013.577 (photo: E. Laflı, 2010)

Сл. 15. Интаљ од црвеној јаспис из вероватној анекса римској утврђења у Хај Рочестеру, Норџамберленд, Велика Британија, са приказом Ероса како на лози беру плод (фотографија Ричарда Карлтона, 2025).

Сл. 16. Интаљ од калцедона у виду скарабеја у једносавном златном прстѐну са окрећанѐм, приказује нају жену која се пере клечећи и држећи амфору изнад главе. Ископано на источном гробљу у Халикарнасу. Пет-четврти век пре нове ере, Музеј научне археологије, Бодрум (фото: Е. Лафли, 2025)

Сл. 17. Интаљ од жиласиој ахаџа са приказом старије, брадавој сатира са посудом за вино. Археолошки музеј Измира, бр. 013.577 (фото: Е. Лафли, 2010)

shown as a tree, in the act of handing down a bunch of grapes to a lower cupid figure who holds a basket. That a goat is depicted standing on its hind legs to browse on the vine shows that the vine is regarded as a real tree like the olive, oak or palm on which goats are usually shown in this way.

Satyrs were also involved in the vintage, sometimes with Eros, as on a carnelian in Copenhagen depicting a satyr and Eros gathering grapes.⁶⁹ However, they were capable of harvesting and processing the grapes by themselves. Thus, a dark carnelian from Fürstenberg, southeast of Xanten, depicts a satyr gathering grapes from a vine and putting them into a bag.⁷⁰ A nicolo, in the collection at Braunschweig depicts the next stage in the process in which a satyr jumps up and down above a shallow bowl, treading the grapes.⁷¹

Amphorae are often depicted on intaglios in Dionysiac contexts. One especially striking and important gem, a blue chalcedony Graeco-Persian scaraboid of the mid-fifth cent. BC excavated in 2021 in a sarcophagus in the eastern cemetery of ancient Halicarnassus (present-day Bodrum), depicts a kneeling female, presumably a maenad, holding an amphora above her head (Fig. 16).⁷² The representation is remarkably assured and naturalistic on this, one of the finest seals of its period, though we have to suspend belief that, in practice, such a heavy vessel could have been lifted above the head with ease. As a representation of a nude female figure, the subject invites comparison with the representation of a standing maenad or ‘girl Pan’ on another blue chalcedony in the Dannicourt Collection at Péronne, Somme in northern France, published by John Boardman,⁷³ although the fluidity of execution and the masterly understanding of anatomy is superior on the Bodrum gem and marks it as being, in all probability, earlier in date. Examples of gems showing amphorae dating from the Roman period include a glass gem in Hanover, upon which a large bodied amphora is shown beneath a tree and, beside it, Eros playing the double pipes;⁷⁴ and a red jasper from Caesarea Maritima, on which Eros is shown riding a slim bodied amphora, to which a sail is attached, as if it were a ship,⁷⁵ in that way perhaps referencing the great trans-Mediterranean maritime trade in wine. During a feast, wine was decanted, and a veined agate in the Archaeological Museum of Izmir (Fig. 17),⁷⁶ a carnelian in the Ashmolean Museum,⁷⁷ and a glass gem from the Lewis Collection in Corpus Christi College Cambridge,⁷⁸ all depict a satyr shouldering a wine skin which he is decanting into the display amphora at his feet. Another

gem, a green chrome chalcedony bought by S. S. Lewis in ‘Smyrna’, shows an elderly satyr holding the handle of a large bulbous amphora that appears to be balanced on a large stone.⁷⁹

The vintage is also represented by intaglios depicting bunches of grapes, including a cornelian set in a gold ring of second or third cent. AD, in the Erimtan Museum.⁸⁰ A similar bunch of grapes is shown on the reverse of a stater of Soloi from the coast of Central Cilicia, dating from the mid-fourth cent. BC (Fig. 18).⁸¹ Vine leaves epitomised the grape harvest and provide quite a common subject for gems, including a garnet in a gold ring and a chalcedony in the Archaeological Museum of Izmir (Figs 19–20)⁸² both dating from the first cent. BC to the first cent. AD and a somewhat later jasper in the Museum of Kahramanmaraş in south-eastern Turkey (Fig. 21).⁸³

Other related depictions on gems

It is highly likely that many of the gems discussed above would have been worn by farmers and small landowners making their livelihoods from the land. By contrast, a first cent. AD pale carnelian in the Hermitage collection is devoted to *otium*, leisure, in a large maritime villa shaded by a spreading tree, on which a bird is perched.

A man driving a pony trap represents how one would have arrived at the villa, while the fisherman with rod and line and the man returning from the hunt most probably represent either the owner or his holiday guest, and the three fishing boats on a calm sea can be related to the joys of boating on the bay of Naples and in similar regions of elite seaside villas around the Mediterranean.⁸⁴

⁶⁹ Fossing 1929, 125, no. 768.

⁷⁰ Platz-Horster 1994, 82–83, no. 33.

⁷¹ Scherf 1970, 34, no. 95.

⁷² Cf. Henig, Laflı 2026 (forthcoming).

⁷³ Boardman 1970, 202 and 291, pl. 548.

⁷⁴ Zazoff et al. 1975, 170, no. 843.

⁷⁵ Hamburger 1968, 32, no. 98.

⁷⁶ Laflı, Henig 2023, 301, no. 5.

⁷⁷ Henig, MacGregor 2004, 56, no. 3.96

⁷⁸ Henig 1975, 25, no. 63.

⁷⁹ Henig 1975, 24–25, no. 62.

⁸⁰ Konuk, Arslan 2000, 171, no. 147.

⁸¹ E.g., Kraay, Hirmer 1966, 365, pl. 675.

⁸² Laflı, Henig 2023, 307–308, nos. 25–26.

⁸³ Laflı, Henig 2023, 308, no. 27.

⁸⁴ Neverov 1976, no. 125.



Fig. 18. Silver coin dated 360–333 BC from Soloi in Cilicia depicting a bunch of grapes on stalk with leaf and tendril on the reverse and head of Athena wearing a crested Corinthian helmet in profile to the right on the obverse [after <<https://www.wildwinds.com/coins/greece/cilicia/soloi/sg5613.jpg>> (accessed on 1st January 2025)]

Сл. 18. Сребрни новчић датиран у период 360–333. п. н. е. из Солоија у Киликији са приказом грозда на стабљници са лисћом и вишњицом на реверсу и лавом Ајџене која носи коринџски шлем са гробеном у профилу нагесно на аверсу [према: <<https://www.wildwinds.com/coins/greece/cilicia/soloi/sg5613.jpg>> (приспућено 1. јануара 2025)]



Figs 19–20. Two intaglios depicting vine leaves. Archaeological Museum of Izmir, acc. nos. 016.130 and 013.535 (photo: E. Laflı, 2010)

Fig. 21. Intaglio depicting a vine leaf. Archaeological Museum of Kahramanmaraş (photo: E. Laflı, 2005)

Сл. 19–20. Два инџаља са приказом лисџова винове лозе. Археолошки музеј Измира, бр. 016.130 и 013.535 (фото: Е. Лафли, 2010)

Сл. 21. Инџаљо са приказом лисџа винове лозе. Археолошки музеј Кахраманмараша (фото: Е. Лафли, 2005)

There are plenty of gems showing fishermen angling with rod and line, including a glass gem and a chrome chalcedony from Aquileia⁸⁵ and a red jasper from Xanten.⁸⁶ In many cases the angler is Eros, as is the case with a red jasper intaglio from Charterhouse-on-Mendip, Somerset, UK⁸⁷ and a carnelian in the Magyar Nemzeti Múzeum in Budapest.⁸⁸ As with the even more numerous hunting⁸⁹ and hare coursing scenes⁹⁰ depict-

⁸⁵ Sena Chiesa 1966, 302, nos. 833 and 835.

⁸⁶ Platz-Horster 1987, 116, no. 204.

⁸⁷ Henig 1975, 23, no. 56; Henig 2007, 107, no. 125.

⁸⁸ Gesztelyi 2000, 57–58, no. 120.

⁸⁹ For example Dimitrova-Milcheva 1981, 60, no. 133 from Durostorum in Bulgaria.

⁹⁰ Dimitrova-Milcheva 1981, 70–71, nos. 12 and 183 also from Bulgaria.

ed on intaglios, these primarily reflect the country pursuits of the gentry rather than the serious business of making a living by farming.

Conclusions

Actual cereal production shown on gems showing an ard, an ear of wheat and a glume are from Anatolia and Syria, with the only provenanced example apart from these coming from Bulgaria, which is not too far away and, as we have noted, gems did get carried by their owners across the Empire. Corn measures, used in measuring quantities of grain, are relatively common subjects on intaglios and are generally accompanied by scales, symbolizing Equity (Latin, *Aequitas*).

The intaglio from Gaziantep depicts an ancient Near Eastern image known since the third millennium BC, transferred in later Graeco-Roman iconographic tradition as a cultural transition. Thus, the Gaziantep gem bears the continuity of a pictorial composition of a *longue durée*. The meaning of a date palm-tree harvest or harvesting dates in the ancient Near East with two harvesters was related to abundance and fertility; we believe that its reception in the Graeco-Roman glyptic tradition also symbolized abundance of agricultural production. There are still a great many problems related to this discussion: for example, is this a scene of a sophisticated agricultural practice, or merely a traditional

reminiscence of a long-vanished past? Did such gems belong to Jewish owners living in ancient Anatolia or Syria, or to farmers supplying dates to the market? These are among the questions on which future studies should focus.

Acknowledgments

If not provided on the photographs or in the captions, images are not to scale.

Figs 2c–e, 6b and 10c were drawn by Ms Leyla Özlüoğlu (Dokuz Eylül University, Izmir) in 2025, to whom we also would like to convey our thanks.

Fig. 15 is kindly provided by Dr Richard Carlton (Newcastle University) from his current excavations at High Rochester, Northumberland, UK.

Map 1 was included by arrangement with Dr Fatih Hakan Kaya (Dokuz Eylül University, Izmir) in 2025, to whom we would like to express our gratitude and appreciation.

We are very grateful to the editors of this journal, Dr Sonja Jovanović and Dr Marija Ljuština (both from Belgrade) for their numerous suggestions. It goes without saying that we remain solely responsible for the final outcome.

Acknowledgments are also due (in alphabetical order) to Professor Erwin Pochmarski (Graz) and Professor Hugo Thoen (Deinze / Ghent), who kindly read a draft of the paper and provided comments.

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GRAECO-ROMAN GEMS WITH HARVESTING SCENES

Keywords. – Date palm, agriculture, harvest, Anatolia, ancient Near East, glyptography, Roman glyptics, Roman period, classical archaeology

This paper describes and discusses gems we have located in Turkish collections relevant to the growth and harvesting of crops. Throughout the Mediterranean area and beyond, the most important aspect was the harvesting of cereals associated with the goddess Demeter or, in the West, Ceres (see Henig 2025). She is always shown holding ears of cereal, and is sometimes depicted on green coloured gems indicative of the growing crop, though sometimes stones with a brown streak on them imply grain ready for harvesting. Of equal importance was the grape vine and the vintage, which is often shown, but almost always with erotes (cupids) as the harvesters of the grapes, probably because they were included in the Dionysiac thiasus, and Dionysus (Bacchus) was the god of wine. We have not so far found a good example in Turkey, though there must be many that show the scene, and have depicted an example from the other end of the Empire, from well beyond the vine growing area. However, that is a reminder of connectivity within the vast Empire which is reflected in exports of amphorae contain-

ing wine, including from Turkey. We represent the subject with representations of wine vessels, grapes and vine leaves as well as of the god himself who is often portrayed on amethyst which was believed to be the colour of wine and a specific against inebriation (cf. Laflı, Henig 2023, 300–301, cat. nos. 2 and 4, 315, pl. 2, figs 2 and 4). The third major harvested crop is the olive, harvested from ancient trees with long sticks, and again widely exported, employed for cooking and or cosmetics. An ancient Hebrew Psalm (Psalm 104, 15) praises “wine to gladden the heart of man, oil to make his face shine, and bread to strengthen man’s heart”.

In our survey we have given particular attention to the date palm, as our rarest gem depicts a harvest which was particular to the East Mediterranean and especially the Levantine coast. Indeed, it was even employed as a symbol, for example on Jewish coins in the Early Roman period, alongside the other staple crops. Dates would have been something of a staple itself in the region and dates were widely exported to Italy and beyond.

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THE POTENTIAL OF AIR PHOTO INTERPRETATION IN SERBIAN ARCHAEOLOGY: A CASE STUDY OF THE SOLNOK SITE IN SYRMIA

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Abstract. – The paper focuses on the application of air photo interpretation in the Syrmia region through the case study of the archaeological site of Solnok, identified as the Roman fortification of *Caput Bassianense*. The study outlines a structured workflow integrating remote-sensing data with GIS-based analysis, demonstrating the practical value of aerial photography for archaeological documentation and interpretation. The results demonstrate the effectiveness of this approach in intensively cultivated landscapes and highlight its importance for future research, as well as for the protection and management of cultural heritage in Serbia. When applied to Solnok, the methodology enabled the reconstruction of a more detailed site layout, identified features previously invisible in ground-based research and demonstrated that the fortification occupies a larger spatial extent than modern literature suggests – significantly improving our understanding of the settlement's organisation and scale.

Key words. – Aerial photography, Satellite imagery, Air photo interpretation, Syrmia, Solnok, Roman fortification, *Caput Bassianense*

Air photo interpretation (API), as a part of the specialist field of remote sensing, has played a significant role in archaeological research since the early 20th century. It provides a unique perspective for identifying subsurface features and understanding broader landscape patterns that are not visible from the ground. As a non-invasive method, API has contributed significantly to archaeological prospection, spatial analysis, and cultural heritage management on a global scale. However, despite its recognized international relevance and some promising early applications within Serbia, the systematic use of aerial photography in Serbian archaeology has remained sporadic and underdeveloped.

The paper presents a methodological study based on a regional aerial survey conducted across the Syrmia region in northern Serbia.¹ Bordered by the Danube and Sava rivers, Syrmia is archaeologically rich, and its lowland terrain is particularly suited for aerial photography due to the flat topography, intensive cultiva-

tion, and seasonal vegetation dynamics (Fig. 1). These characteristics make it an ideal setting for exploring how satellite imagery, historical aerial archives, and newly acquired oblique aerial photographs can contribute to archaeological research. The region was chosen not for a single site, but for the broader archaeological potential of the landscape as a whole.

¹ This research is a part of an ongoing PhD thesis entitled *Remote Sensing of Archaeological Sites and Features in Syrmia in Serbia*, by the author at the Department of Archaeology, Faculty of Arts, University of Ljubljana. Aerial survey flights were organized and supervised by the same department, and the project was financially supported through internal faculty funds as well as a research grant awarded by the Aerial Archaeology Research Group (AARG) in support of airborne remote sensing in archaeology. The author gratefully acknowledges the support of the Department of Archaeology, Faculty of Arts, University of Ljubljana – particularly Professors Darja Grosman and Predrag Novaković – as well as the Aerial Archaeology Research Group (AARG – <https://aargonline.com/wp>), whose funding made the aerial reconnaissance and related research activities possible.

To demonstrate the potential of this approach, the archaeological site of Solnok was selected as a case study (Fig. 1). Situated between the Roman cities of Sirmium and Singidunum, it is identified as *Caput Bassianense*, a Roman fortification. The combination of a well-documented historical context and flat, cultivated terrain makes Solnok an excellent testing ground for air photo interpretation. Earlier research relied mainly on surface finds and small-scale excavations, making the site particularly suitable for assessing how remote sensing can generate new insights, even at locations that are already partially understood. The study has two primary objectives. First, to present a structured workflow for applying air photo interpretation in archaeological research within the Syrmia region, and second, to demonstrate its effectiveness through the case study of Solnok.

Aerial Photography and Satellite Imagery in Archaeology

Aerial photography and satellite imagery have become essential tools in modern archaeology, providing a bird's-eye perspective that reveals patterns and features often invisible at ground level. These traces manifest as soil marks (colour and moisture variation), crop marks (differential plant growth influenced by buried features), or shadow marks (micro-relief visible under low-angle light).

The application of these methods in archaeology largely depends on the method of recording – particularly the viewing angle and the type of platform employed. Vertical imagery, usually obtained from high-altitude aircraft or satellites, offers accurate planimetric representation suitable for mapping and spatial analysis, although such datasets are often collected for

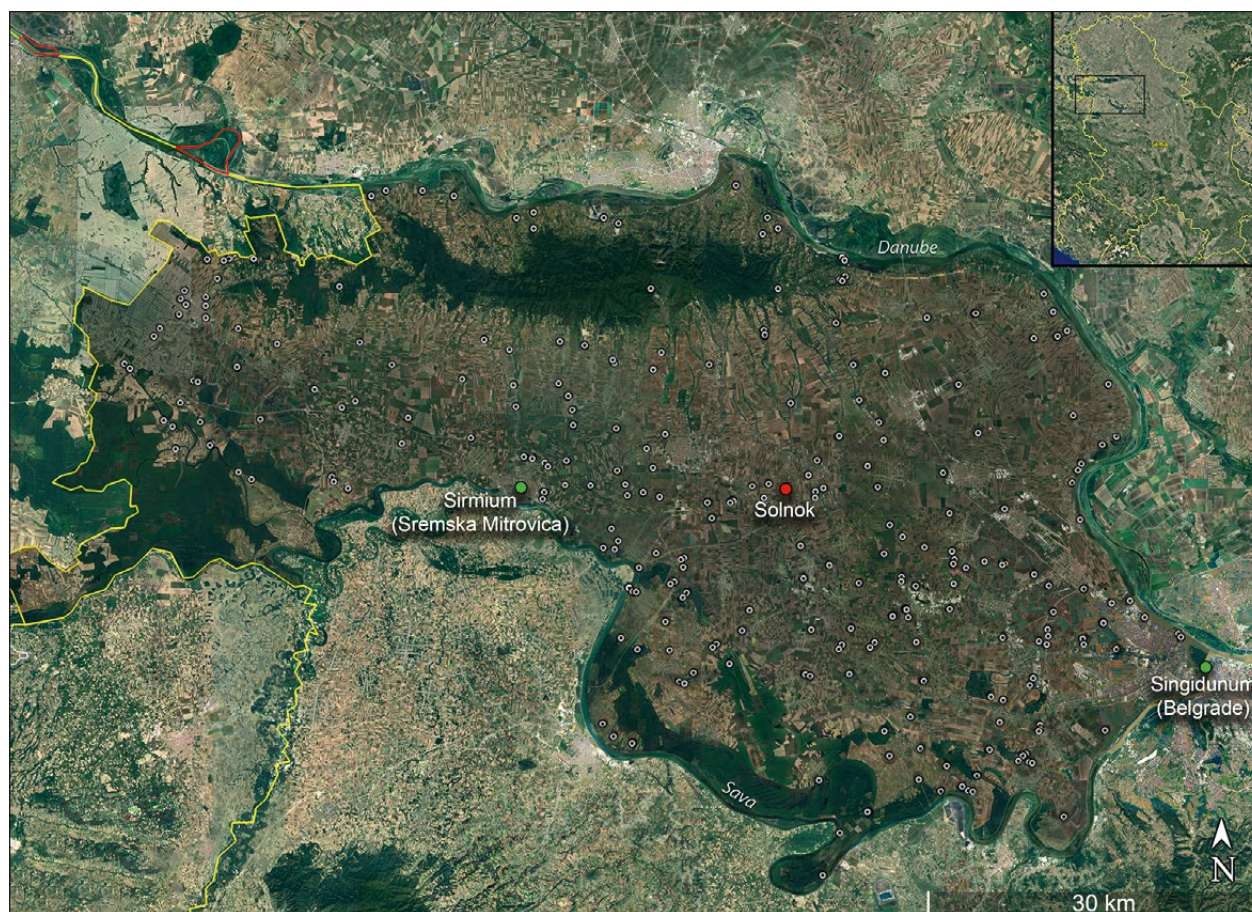


Fig. 1. Syrmia, bordered by the Danube and Sava rivers. The map shows a high density of archaeological sites (base map: Google Earth; map created by the author)

Сл. 1. Срем, окружен рекама Дунавом и Савом. На картији је приказана велика густина археолошких налазишта (основна картија: Google Earth; картију израдио аутор)

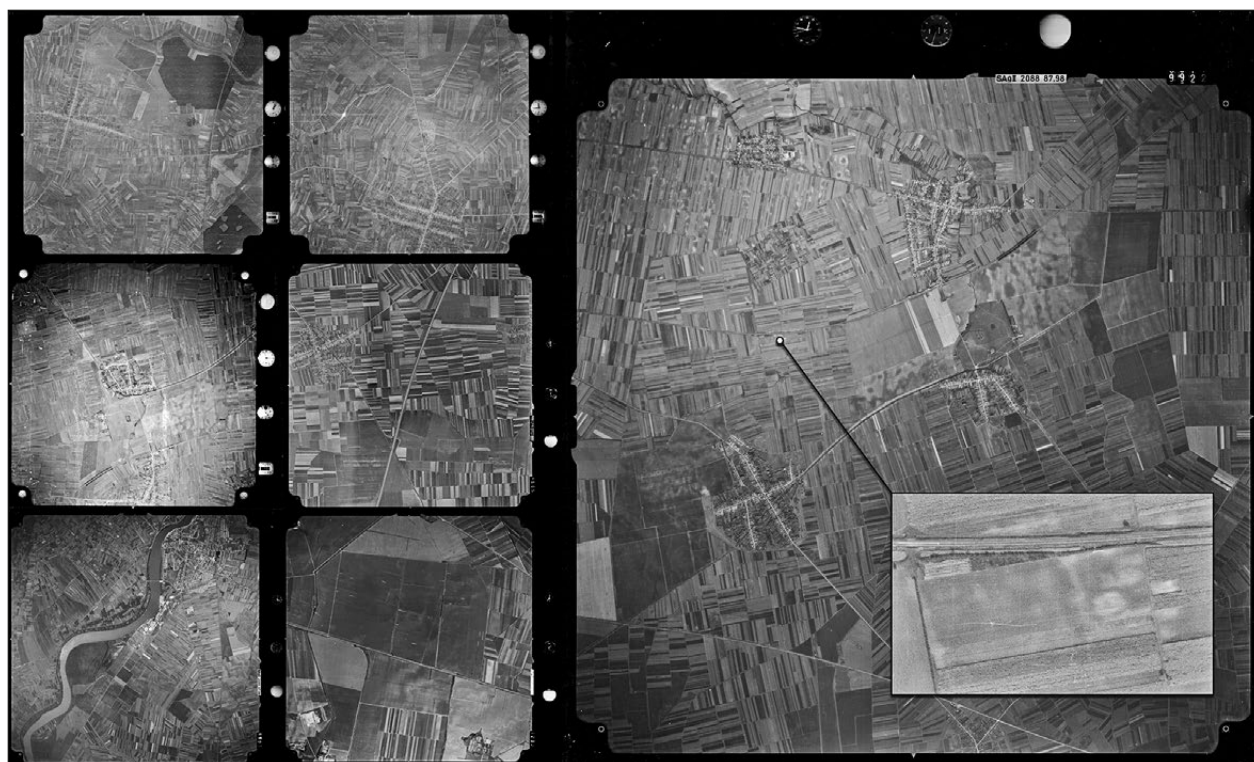


Fig. 2. Archival vertical aerial photographs from the Military Geographical Institute (VGI), Belgrade, taken during systematic flight missions conducted over the Syrmia region. The enlarged section (right) highlights visible archaeological traces (source: VGI Belgrade; processed and edited by author)

Сл. 2. Архивске вертикалне аерофотографије Војногеографског института (ВГИ), Београд, снимљене током систематских летова над Сремом. Увећани део (десно) приказује уочљиве археолошке трагове (извор: ВГИ Београд; обрадио и уредио аутор)

non-archaeological purposes and not always under optimal visibility conditions. Stereo pairs, formed by overlapping these images, allow for the creation of three-dimensional models, orthophotos and precise metric outputs. Vertical imagery also includes satellite datasets, ranging from early missions such as Landsat to high-resolution commercial platforms such as Google Earth, which enable archaeological monitoring of landscape changes, preliminary prospection and multi-temporal comparison. On the other hand, oblique photographs, typically captured from low-flying aircraft, allow targeted recording under specific seasonal, moisture, and lighting conditions, often providing superior interpretative clarity, but requiring geometric correction for spatial accuracy.

Integrating both historical and contemporary imagery into Geographic Information Systems (GIS) enhances interpretative potential, enabling detailed mapping, spatial analysis, and reproducible documentation through standardized metadata such as acquisition date,

coordinates, and recording conditions. To support such integrative approaches, European initiatives such as the INSPIRE Geoportal², as well as international platforms like EuroGeographics³, provide centralized access to a wide array of spatial datasets, including aerial photography, topographic maps, and thematic layers essential for archaeological research and landscape interpretation.

For a comprehensive introduction to the principles, history, and archaeological applications of aerial photography and satellite imagery, several foundational publications remain essential reading and contextualize the methodological framework employed in this paper.⁴

² <https://inspire-geoportal.ec.europa.eu/>

³ <https://eurogeographics.org/>

⁴ Brophy, Cowley 2005; Cowley, Palmer 2009; Barber 2011; Musson, Palmer, Campana 2013.

Aerial Photography in Serbia

Although Serbia has a substantial archive of aerial photography, its systematic application in archaeology remains notably underdeveloped. Historically, aerial data collection in Serbia was primarily carried out by the Military Geographical Institute (VGI) in Belgrade. Between the 1950s and 1990s, the institute executed extensive surveys for topographic mapping, environmental monitoring, flood control, agricultural planning and military reconnaissance. These large-scale vertical photograph collections – acquired along parallel flight paths – document landscapes prior to major infrastructural and agricultural transformations, thereby offering a valuable, but largely unexploited, archive for archaeological research (Fig. 2).

The first notable archaeological use of aerial photography in Serbia dates back to the 1930s, when Miodrag Grbić utilized aerial imagery to study the Roman city of *Bassianae* in the Syrmia region.⁵ After World War II, Aleksandar Deroko analysed military photographs from 1947 to interpret the topography of Caričin Grad and to propose the existence of suburban settlements.⁶ The history and challenges of aerial photography in Serbian archaeology have previously been discussed,⁷ covering a timeline from its early use in the 1930s to recent practice. Its usage remained sporadic, typically driven by individual researchers rather than institutional initiatives.

Here, it is important to note two organized aerial survey campaigns conducted in Serbia by the Department of Archaeology in Ljubljana: the first during the ArchaeoLandscapes Europe (ArcLand⁸) project, when a summer school of aerial photography was held in Požarevac, and the second through their research activities in Banat over the past decade. Although these flights were not systematic, they formed part of a broader project on the application of aerial photography in Banat. Their methodological approach was later presented within the training materials prepared for the HERISTEM strategic partnership project (Erasmus+).⁹

Methodological Approach

The methodological framework was structured into sequential phases designed to ensure systematic data acquisition, processing and interpretation. These phases included preparatory research and database construction, flight planning and aerial reconnaissance, and post-flight processing, archiving and analytic interpretation. A key element of the workflow was the

integration of multiple data sources – archaeological documentation, satellite imagery, historical aerial archives and newly collected oblique photographs – into an integrated analytical system suited to archaeological interpretation.

Preparatory Phase

The preparatory phase focused on constructing a spatial database in QGIS, open-source piece of software, to consolidate archaeological and environmental datasets.¹⁰ Layers included documented archaeological sites, topography, hydrology, soil type, land use, vegetation, cadastral plans and infrastructure networks (Fig. 3, top).¹¹ Each site was assigned a unique identifier with attributes¹² relating to type, chronology, preservation status and coordinates, enabling a regional overview and highlighting areas of high concentration as well as gaps in documentation (Fig. 3, bottom).

Building on this GIS infrastructure, satellite imagery from platforms such as Google Earth, Bing Maps, and Sentinel-2 were consulted to examine both archaeological and environmental variables. Google Earth's

⁵ Грбић 1936, 26, сл. 3; cf. Filzwieser *et al.* 2021.

⁶ Дероко, Радојчић 1950, 127, сл. 3, 4.

⁷ Бугарски, Иванишевић 2014, 251–264.

⁸ <https://www.archaeolandscapes.eu/>

⁹ Unpublished training material for the HERISTEM strategic partnership project (Erasmus+) – *Remote Sensing in Archaeology – Short Companion to Basic Concepts of Aerial Photography and Aerial Survey in Archaeology* by Darja Grosman and Predrag Novaković; documentation of the Department of Archaeology, Faculty of Arts, University of Ljubljana.

¹⁰ The datasets were prepared by the author as part of the PhD thesis *Remote Sensing of Archaeological Sites and Features in Syrmia in Serbia* (in progress).

¹¹ I would like to express my gratitude to the international GLAC Project, within which I was working on the development of a GIS database for the region of Syrmia, and whose support through a four-year fellowship significantly contributed to the progress of this and my PhD research. I am especially grateful to my colleagues John Whitehouse and Milijan Dimitrijević, whose assistance, expertise and encouragement were essential to the successful realization of this research.

¹² The metadata table used for single sites in the GIS is substantially larger than the portion displayed in the illustration. The full schema contains additional attribute fields that could not be visually represented due to space and readability limitations. Each site is assigned a general chronological frame, but dating is further structured by century-level attributes, allowing distribution maps to isolate, for example, only 1st-century, 2nd-century, or 5th-century records. The same applies to site typology: where identification is uncertain due to limited investigation, categories are recorded separately to ensure analytical clarity.

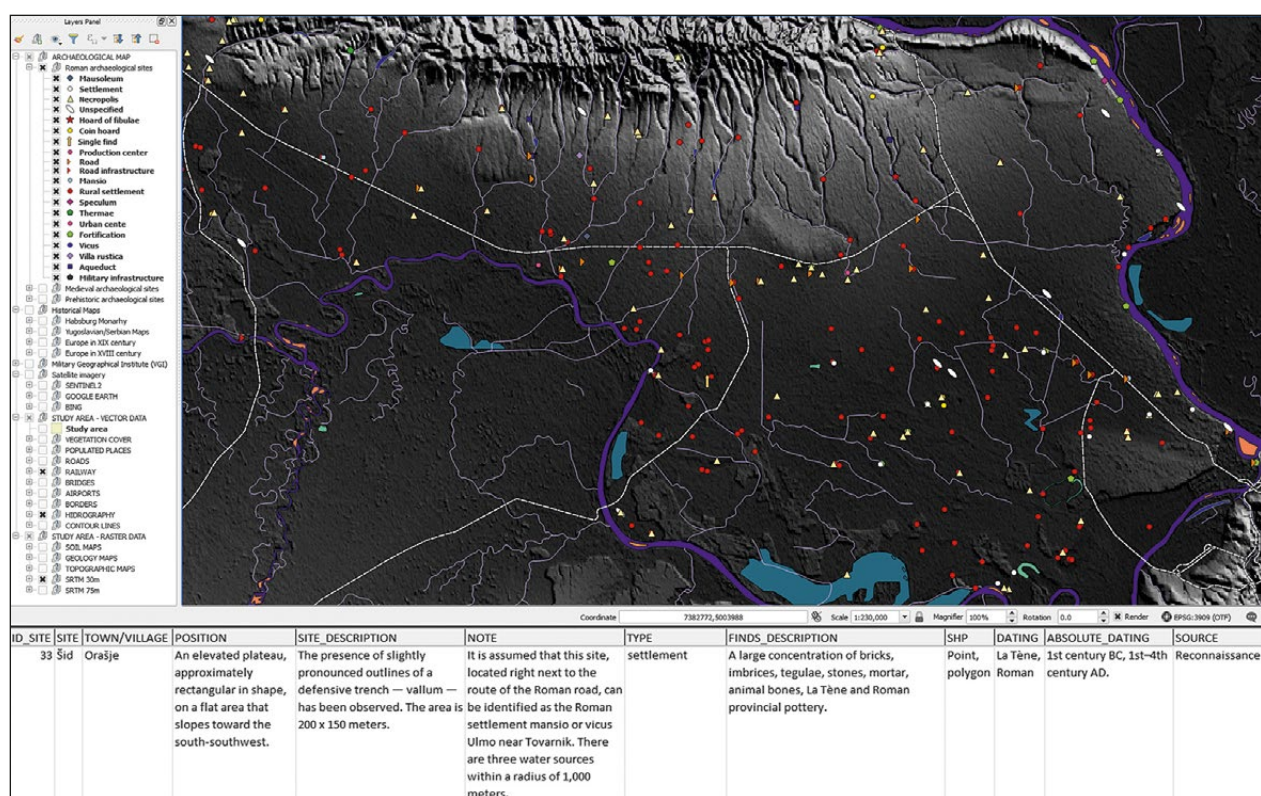


Fig. 3. Structure of the archaeological GIS database – top; and applied attribute example for site classification and distribution analysis – bottom (screenshot from the author's GIS database)

Сл. 3. Структура археолошке ГИС базе података – горе; и пример применених атрибуција за класификацију налазишта и анализу дисперзије – доле (извор: ауторова ГИС база података)

historical imagery proved particularly valuable for multi-temporal assessment and detecting potential soil and crop marks. Additional platforms such as Satellites.pro, Zoom Earth, and NASA World Wind offered real-time data and spectral comparisons from multiple providers. Historical aerial photographs from the Military Geographical Institute,¹³ covering the period from the 1950s to the 1990s, were georeferenced and overlaid on satellite basemaps, offering temporal depth for analysing landscape transformation, former hydrology, plot divisions, and erased archaeological traces.

A new aspect in this phase was the use of a crop-monitoring platform,¹⁴ originally developed for agriculture, to determine optimal flight windows. Indices such as NDVI (Normalized Difference Vegetation Index) and NDMI (Normalized Difference Moisture Index) were monitored to identify vegetation stages favourable for archaeological visibility. These indices are commonly used in remote sensing applications

and have been effectively applied in archaeological reconnaissance through Sentinel-2 data.¹⁵ Although not precise enough to detect archaeological remains directly – due to its low resolution and imprecision – these indices were effective for determining periods of bare soil (soil mark detection) and crop maturity (crop mark visibility) (Fig. 4).

Aerial Reconnaissance

Aerial reconnaissance was conducted after several months of preparation, aimed not at general photography but at targeted archaeological prospection. The

¹³ I also wish to extend my deep appreciation to Colonel Radoje Banković, whose invaluable help in conducting aerial photography and expert advice greatly supported the technical and interpretative aspects of this work.

¹⁴ <https://crop-monitoring.eos.com/>

¹⁵ Broch 2021, 9–11.



Fig. 4. Example of crop monitoring data analysis used to determine the optimal time window for detecting soil marks and crop marks (interface from EOSDA Crop Monitoring)

Сл. 4. Пример анализе података са платформе за праћење усева, коришћене за одређивање оптималног периода за уочавање археолошких трагова на земљи и вегетацији (интерфејс са EOSDA Crop Monitoring платформе)

survey strategy was based on known sites, satellite and archival indications, and hypotheses derived from GIS analysis. Based on vegetation cycles, meteorological conditions and NDVI fluctuation, the optimal recording window was identified as late May to mid-June 2022 – when wheat and corn enter phenological phases most responsive to buried structures.

Flights were conducted in cooperation with JAT Agricultural Aviation (Vršac) from the airfield at Veliki Radinci, providing immediate regional access. Survey sectors were planned to cover the landscape systematically – northward from the Sava to Fruška Gora, and transversely along an east–west axis. A small, high-wing Cessna 172 Skyhawk aircraft was used, enabling low-altitude manoeuvring, circling around anomalies and rapid adjustments based on in-flight observation.

Over four survey days – May 9th, 10th, 11th and June 14th – approximately 1,500 oblique photographs were taken using Nikon APS-C DSLR cameras¹⁶ with intentional overlap for later photogrammetric processing. Flight sheets documented aircraft, pilot, weather, soil conditions, flight duration, observed features, and route deviations (Fig. 5). Additional observations and in-flight details may sometimes be recorded manually

with symbols and/or descriptions (Fig. 5) or by using a voice recorder.

Continuous GPS logging ensured the precise reconstruction of flight tracks, altitude, sector coverage and accurate georeferencing of photographs (Fig. 6). Altitude ranged from 300–600 m, depending on agricultural clearance and aviation control. In some cases, a revisit of specific sectors was required to adjust altitude or lighting to improve visibility.

Equally as important as the technical setup was the collaboration between the archaeologist and the pilot. Pre-flight coordination involved meetings to define objectives, responsibilities, and in-flight communication protocols. This collaborative model proved essential. The constant movement of the aircraft required split-second decision-making. The pilot's role was to ensure flight safety and maintain a steady altitude, while the archaeologist provided input for photographic positioning, identifying potential archaeological features and proposing minor adjustments to the

¹⁶ Nikon D300 (12.3 MP; 4288 × 2848 px) and Nikon D3400 (24.2 MP; 6000 × 4000 px).

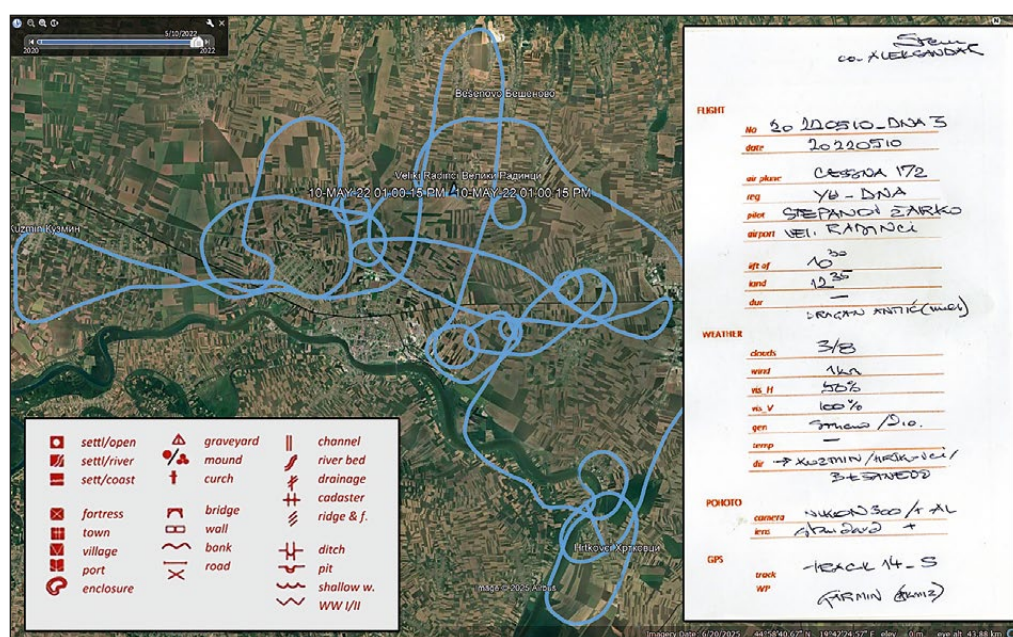


Fig. 5. GPS track of the aerial reconnaissance in Syrmia, with route and survey coverage (May 10th) displayed over Google Earth imagery, including right-side flight sheet and lower-left observation symbols (base imagery: Google Earth; GPS track and visualisation by the author)

Сл. 5. Геоереференцирани записи трајекте аеро-рекогносцирања у Срему, који приказује путању леија и покривеност истраживања (10. мај) преко Google Earth подлоге, укључујући белешке са десне стране и симболе зајажњања у доњем левом углу слике (основна подлога: Google Earth, геореференцирани трајекти и визуелизација аутора)

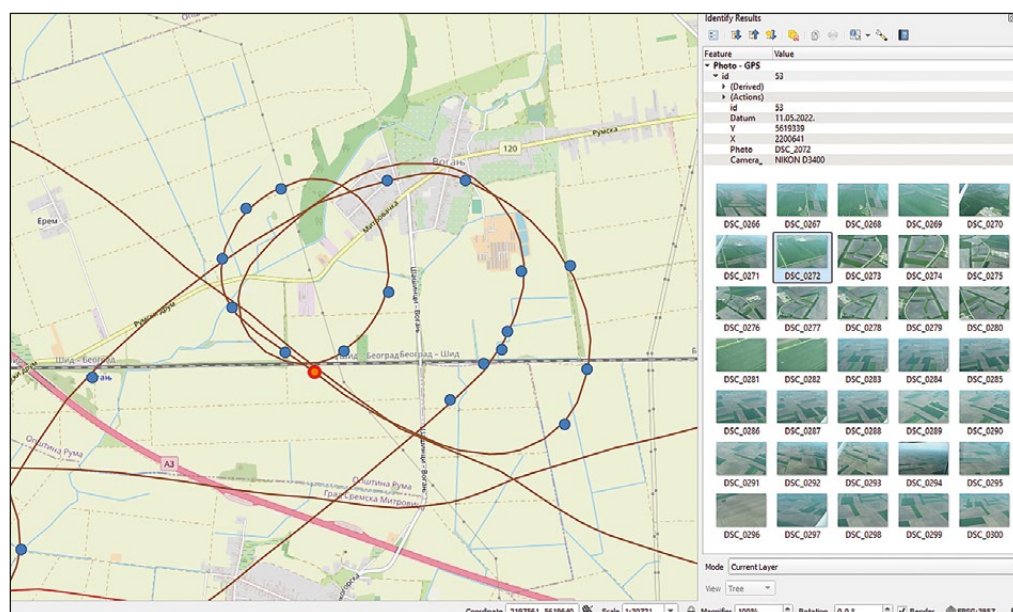


Fig. 6. Each image received a unique identifier and was cross-referenced with the corresponding GPS flight tracks. The figure shows a screenshot from the QGIS database with image indexing and location data displayed over Google Maps base imagery (screenshot from the author's GIS database)

Сл. 6. Свакој фототографији додељен је јединствени идентификацијор и повезана је са одговарајућом GPS путањом леија. Приказан је исечак из QGIS базе са индексирањем слика и подацима о локацији преко Google Maps подлоге (исечак из ауторове ГИС базе података)

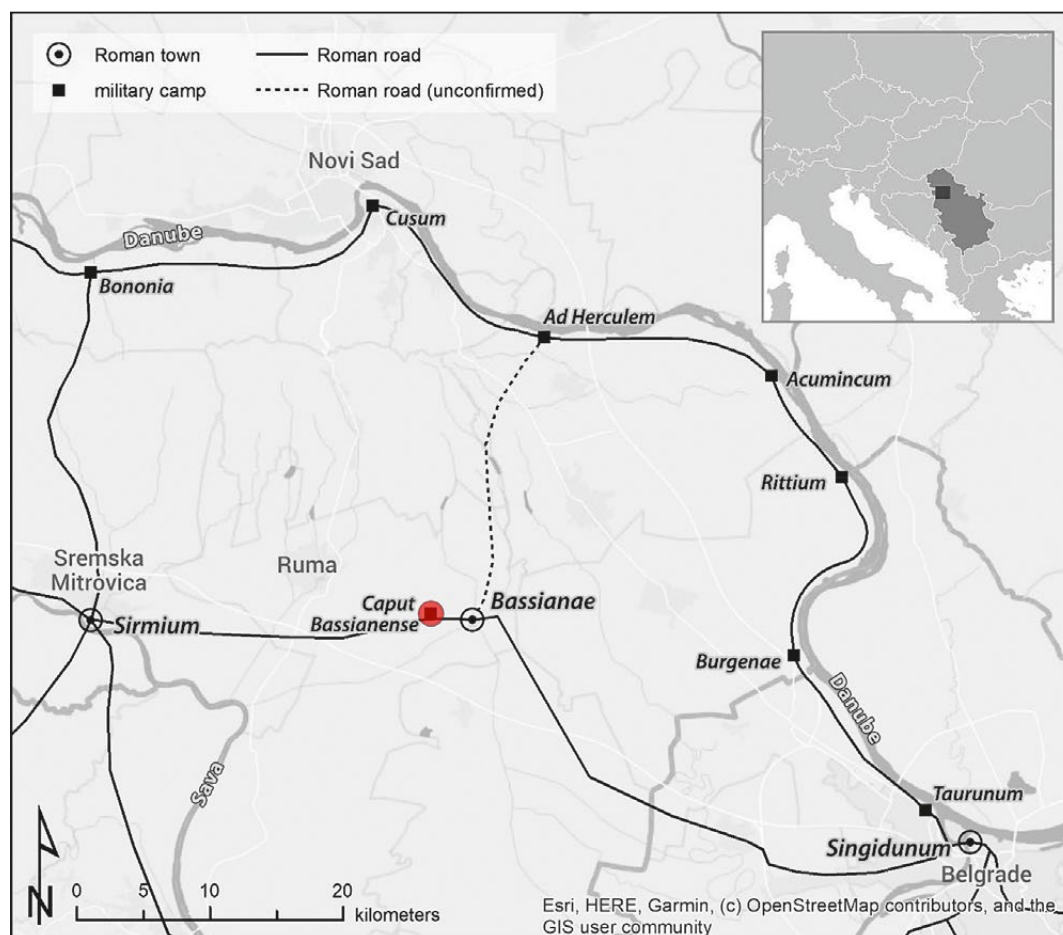


Fig. 7. Location of Solnok site (*Caput Bassianense*) between Singidunum – today's Belgrade, and Sirmium – today's Sremska Mitrovica (according to Filzwieser et al. 2021, 2, modified by the author with the added location)

Сл. 7. Положај локалитета Солнок (*Caput Bassianense*) између Синигунума – данашње Београде, и Сирмијума – данашње Сремске Митровице (према: Filzwieser et al. 2021, модификовао аутор додавањем локације)

flight path. In addition, the pilot's own expertise in agro-aviation proved valuable, as his observations occasionally prompted unplanned deviations to investigate subtle differences in soil moisture or vegetation growth that he had learned to recognize after repeatedly flying these routes.

Post-Flight Processing: Archiving, Mapping and Interpretation of Data

Post-flight processing began immediately after each session. All photographs were catalogued, renamed with unique identifiers, backed up in multiple copies and linked to corresponding GPS flight logs (Fig. 6). Field notes, sketches and audio comments were digitized, allowing cross-referencing between visual data and field observations.

Interpretation followed the systematic image review ("photo-reading"), differentiating natural vs. anthropogenic signatures, recognising tonal and textural variation, crop behaviour anomalies, and micro-relief indicators. Areas without visible traces were also evaluated, as absence may indicate erosion, deep burial or unfavourable vegetation stage.

Selected images were georeferenced using ground control points (roads, cadastral features, or railway lines). Oblique images requiring spatial correction were rectified photogrammetrically. In cases of sufficient overlap, datasets were processed in Agisoft Metashape to generate orthophoto mosaics and 3D models (Fig. 12). Due to heterogeneous crops, photogrammetry was used exclusively for orthorectification rather than terrain modelling.

Mapped features were recorded in GIS with standardized symbols, metadata (source image, date, crop state, and visibility condition) and measured geometry. This ensured reproducibility, transparent interpretation and long-term archival value. The resulting orthophoto formed the spatial basis for analysis in the Solnok case study.

Case Study: Solnok – Grad in Dobrinici

To illustrate the practical outcomes of this approach, the following case study focuses on the site of Solnok. Although the aerial survey covered a wider area, Solnok was selected for its well-documented historical background and spatial characteristics that made it suitable for testing the full methodological workflow.

The archaeological site of Solnok, also known as Grad in Dobrinici,¹⁷ is located near the village of Dobrinici in the Syrmia region of Serbia (Fig. 7). Widely identified as *Caput Bassianense*, the fortification occupied a strategic position on the Sirmium – Singidunum route, behind the Danube Limes, and likely served both military and logistical functions. Although surface remains are not visible today, based on previous research the site extends across approximately 14 ha of flat terrain and has yielded significant material through long-term agricultural disturbance.

Although no visible structural remains are present on the surface, Solnok is rich in archaeological material, largely due to specific land use practices such as agriculture and ploughing. Previous research has provided valuable insights into its historical significance, but has mainly focused on surface observations and short-term excavation.

History of research

The archaeological investigation of Solnok dates back to the late 19th century. The site was first discovered in the late 1800s during the construction of a railway line between the villages of Petrovac and Kraljeveci, which intersected the fortification. Initial observations were made by Šime Ljubić, who interpreted the findings as remnants of a significant historical settlement, possibly dating back to Roman times. Based on his early observations, Š. Ljubić initially located the Roman municipium of *Bassianae* at the Solnok site. However, this theory was later corrected by the discovery of *Bassianae* nearly 2.5 kilometres to the east. Nevertheless, Ljubić's interpretation, which included the following plan of the site (Fig. 8b) developed through the analysis of earlier maps by L. F. Marsigli and A.

Donergh,¹⁸ laid the groundwork for early archaeological research, offering early insights into the historical importance of the site.¹⁹ Although Š. Ljubić had access to earlier cartographic sources, another important 18th-century cartographic source is the First Military Survey of the Habsburg Empire (1764–1784), where Solnok is clearly identified (Fig. 8a), confirming its visibility and relevance in the past landscape.

In the early 20th century, J. Brunšmid visited the Solnok site during his reconnaissance of the Syrmia region. In addition, he worked on the systematic processing of stone monuments transported from this area to the Archaeological Museum in Zagreb, mentioning several fragments which, based on contextual indicators, may have originated from this site.²⁰ Further investigations conducted in the 1960s focused on reconnaissance of the area surrounding the Solnok site. These surveys identified a significant concentration of archaeological material, including fragments of epigraphic monuments, marble slabs, mosaic *tesserae*, lime mortar, and bricks stamped with the seal LEG II A of the *Legio II Adiutrix*, emphasizing the significance of the site.²¹

In 1992, small-scale excavations were carried out at Solnok, focusing on the southern rampart and two towers. Their work revealed two phases of the rampart, suggesting initial construction in the 2nd century and later renovation in the 3rd century AD. The campaign yielded significant findings, including architectural elements that informed an ideal reconstruction of the fortification based on research by M. Petrović, who integrated the results of the 1992 excavations into a site plan, illustrating the probable distribution of the towers within the fortification (Fig. 8c).²²

In addition to excavation-based investigations, the site has also been discussed in the works of M. Đorđević,²³ M. Milin,²⁴ and A. Crnobrnja,²⁵ who each

¹⁷ By the decision of the Government of the Republic of Serbia, the archaeological site of Solnok – Grad u Dobrincima (Solnok – Grad in Dobrinici) was declared an immovable cultural property in the Official Gazette of the Republic of Serbia, No. 50, dated May 18th, 2012 (Central Register Number: AN169).

¹⁸ Ljubić 1883, 66–68.

¹⁹ Ljubić 1883, 65–70.

²⁰ Brunšmid 1911, 78, 122.

²¹ Popović 1966, 187.

²² Petrović 1995, 221–232.

²³ Đorđević 2007, 47–49.

²⁴ Milin 2004, 260–264.

²⁵ Црнобрња 2020, 116–117.

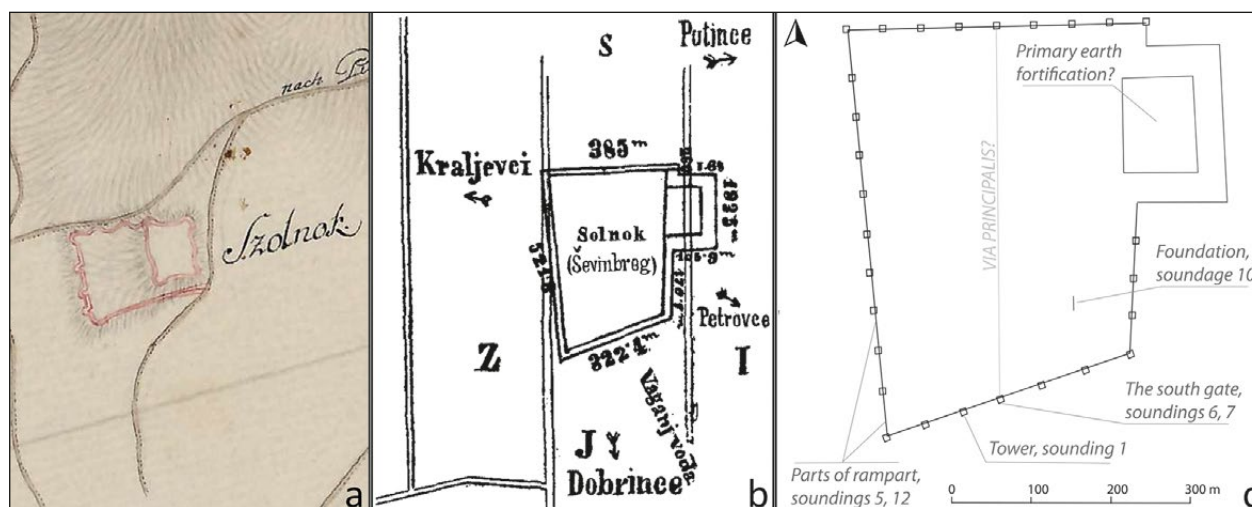


Fig. 8. Historical interpretations of the Solnok site based on earlier research:

a) Solnok on the First Military Survey of the Habsburg Empire (1764–1784); b) Situational plan of the site by Š. Ljubić, combining his own observations with A. Donerg's and L. F. Marsigli's cartographic data (edited by the author); c) Reconstructed layout of the fortification according to M. Petrović (edited by author)

Сл. 8. Историјске локализације локалитета Солнок на основу ранијих истраживања:

a) Солнок на Првом војном мјеру Хабзбуршке монархије (1764–1784); b) Ситуациони план локалитета који је сачинио Ш. Љубић, комбинујући сопствена запажања са картографским подацима А. Донерга и Л. Ф. Марсилија (уредио аутор); c) Реконструисан изглед утврђења према М. Петровићу (уредио аутор)

provided a summary of earlier research along with their own interpretations. Among the more recent contributions, especially those of relevance for the present research, a notable addition is the Google Earth satellite image published by A. Crnobrnja,²⁶ in which the outline of the Roman fortress can be clearly observed. Recent studies by M. Dimitrijević and J. Whitehouse also consider Solnok, discussing its possible role within the canal-based transport system of Syrmia,²⁷ as well as its place in the context of Roman land distribution and settlement around *Bassianae*.²⁸ It is also worth noting their continued contribution over the past decade to the development of remote sensing approaches in the Syrmia region, particularly through the use of LiDAR and satellite imagery.

Archaeological context

Based on parallels from the Iron Gates Limes, the earliest construction horizon at Solnok is dated to the first half of the 1st century AD, coinciding with the establishment of early Roman military footholds in southern Pannonia.²⁹ This earliest horizon, although not confirmed by direct archaeological excavation, has been interpreted by M. Petrović as a palisaded fortification, inferred from the unusually broad rampart

remains.³⁰ These features are best explained as the remnants of an earthen embankment topped by a wooden palisade, a construction type characteristic of the initial phases of Roman military camps in the 1st century AD, prior to the construction of stone fortifications. Petrović's interpretation is based on indirect evidence, namely rampart dimensions, analogies with comparable sites, and established Roman military building practices. Accordingly, this palisaded enclosure is understood as belonging to the earliest phase of camp organization. This phase may even precede the construction of the main *Sirmium–Bassianae–Taurinum* road. Its location suggests that Solnok functioned as a frontier control point from the outset, serving surveillance and security purposes during the consolidation of Roman authority north of the Sava.

In the late 1st and 2nd centuries, detachments of *Legio I Adiatrix* may have been stationed here, as indi-

²⁶ Црнобрња 2020, 117.

²⁷ Dimitrijević, Whitehouse 2024, 180.

²⁸ Dimitrijević, Whitehouse 2024, 128–130.

²⁹ Petrović 1986, 92.

³⁰ Petrović 1995, 223.

cated by epigraphic evidence from the wider *Bassianae* area.³¹ These traces reflect the strategic importance of the site during the stabilization of newly annexed territory and the supervision of local populations. During the late 1st and the beginning of the 2nd century AD, the fort³² underwent substantial expansion, receiving stone ramparts. Ramparts approximately 1.05 m thick are assigned to the earlier building phase, while the later phase – with walls nearly 1.8 m thick and semi-projecting towers – likely corresponds to major reconstruction during the late 3rd century. Such features, executed according to standardized Roman foot measurements, exemplify the formalized military engineering typical of Pannonian frontier architecture.³³

The reinforcement of the ramparts, the construction of large gates, and the addition of corner towers are associated with imperial reforms of the Tetrarchy era and the restructuring of frontier defence during the 3rd-century crisis. Parallels may be observed across the regional limes fortifications: doubled ramparts and renovated eastern towers at Čezava,³⁴ the construction of a gate tower with an accentuated projection at Boljetin,³⁵ and comparable reconstructions at Veliki Gradac near Donji Milanovac. A tower of similar dimensions was also built at Pesača, while the fortification at Ravna featured square, protruding towers.³⁶

By the 4th century, Solnok, if identified with *Caput Bassianense*, was incorporated into the late Roman frontier system along the Syrmia corridor. The *Notitia Dignitatum* identifies the *cohors I Thracum civium Romanorum* as the garrison stationed at *Caput Bassianense*.³⁷ The site location near *Bassianae* and its connection to the regional road network indicate a well-developed logistical and infrastructural role, essential to supply, troop movement, and territorial control in the hinterland of Sirmium – one of the imperial capitals under the Tetrarchy.

In the 5th century, the *Bassianae* region and, by extension the wider area of Syrmia, experienced significant disruption³⁸ following the Hun occupation of *Pannonia Secunda* in 441 and 447. At that time, the Empire was deprived of authority in this region for the first time, after Syrmia became a battleground of rival Germanic groups and ultimately the southernmost possession of the Avar Khaganate.³⁹ With regard to the 6th century, Emperor Justinian explicitly states in his *Novella XI* that *Bassianae* belonged to the Empire, a view corroborated by the chronicler Hierocles, whose work was completed before 535.⁴⁰ Nevertheless, there are no known archaeological finds that directly attest

to continuous imperial control during this period. In the decades that followed, central authority appears to have weakened, and some scholars have suggested that the area may have been held by Herulian *foederati* as a transitional arrangement. This situation persisted until the arrival of the Avars after 567, when Roman rule in the region finally collapsed.

Solnok Before the Flight:

Satellite imagery, archives, plans

Building upon the methodological framework presented in the Preparatory Phase chapter, the research proceeded with a comprehensive examination of all pre-flight materials assessed for the Solnok site, thereby establishing the analytical basis for the subsequent aerial survey. Analysis of pre-flight sources began with Google Earth imagery.⁴¹ Between 2007 and 2024, a total of 27 images were available for this site. While most images did not reveal clear traces of structures, some stood out as soil marks – particularly those from February 2019 (Fig. 9/2019). All images with a positive archaeological signal were taken before the onset of intensive vegetation – in late winter or early spring – when the topsoil is dry and bare enough to allow visual detection of colour or texture variations.

The February 2019 images show nearly ideal conditions for detecting soil marks, with clearly rectangular and linear shapes in the central zone of the site. The April 2007 and 2009 images display similar shapes, although with less intensity, due to the beginning of the vegetation growth. Images from October did not yield usable results. A comparison between February and October clearly indicates that late winter/early spring is the most favourable period for registering

³¹ Душанић 1968, 89–90.

³² This is relevant only if the interpretation that a palisaded fortification existed here is correct, an issue to which the author will return later in the text.

³³ Petrović 1995, 222–225.

³⁴ Vasić 1982–1983, 91–100.

³⁵ Зотовић 1982–1983, 219–220.

³⁶ Минић 1982–1983, 171–172; Кондић 1982–1983, 247.

³⁷ *Not. Dign. occ. XXXII* 59 (*Tribunus cohortis primae Thracum civium Romanorum, Caput Basensis*); Dušanić interprets *Caput Basensis* as *Caput Bassianense*, see: Душанић 1968, 89.

³⁸ Dušanić 1967.

³⁹ Бугарски, Иванишевић 2023, 672–673.

⁴⁰ Milin 2004, 257.

⁴¹ <https://www.google.com/earth/about/versions/#earth-pro>

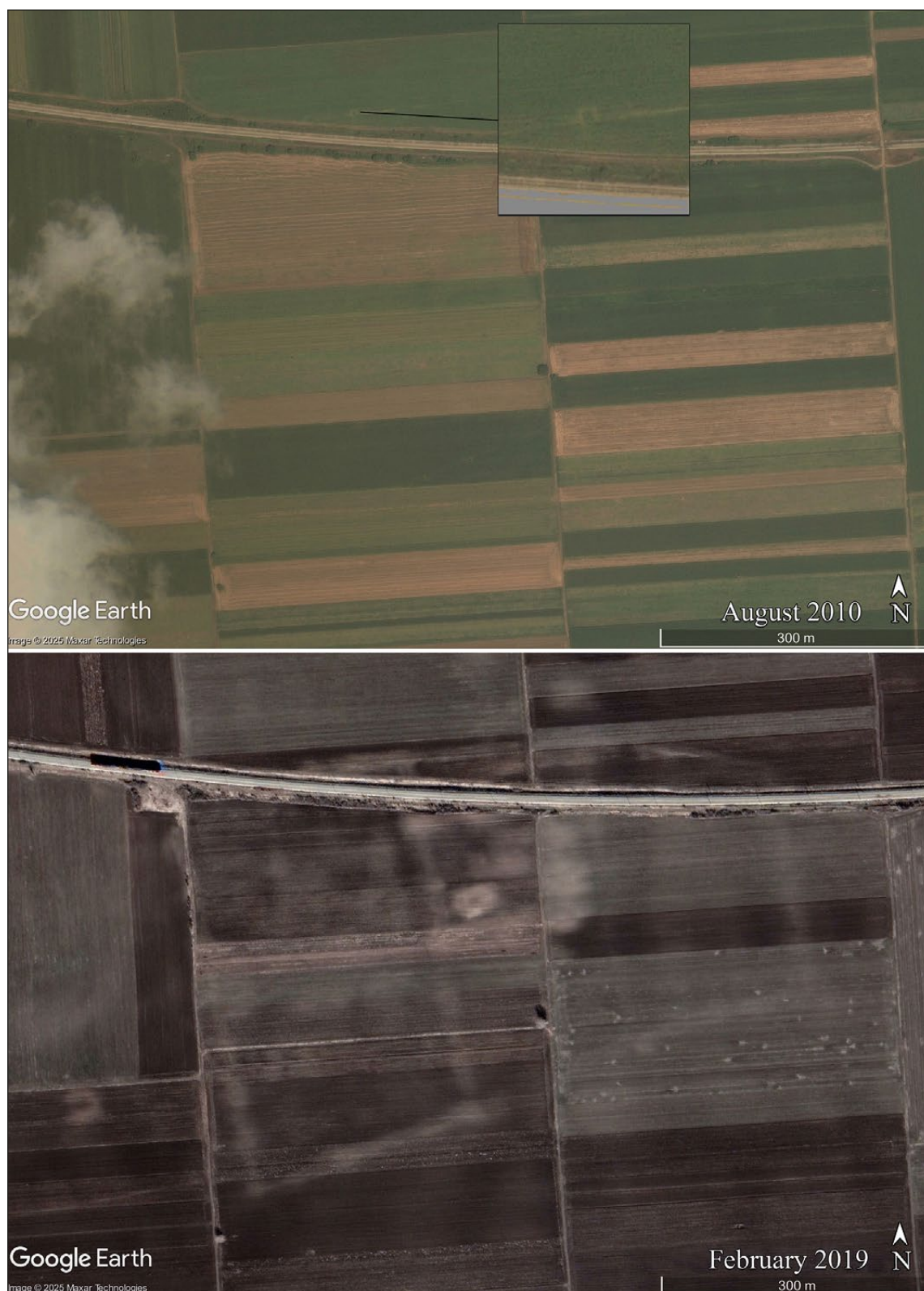


Fig. 9. Comparison of Google Earth satellite images showing the presence and absence of visible archaeological structures (source: Google Earth, edited by the author)

Сл. 9. Поређење сателитских снимака са Google Earth-а који приказују присуство и одсуство видљивих археолошких структура (извор: Google Earth, уредио аутор)

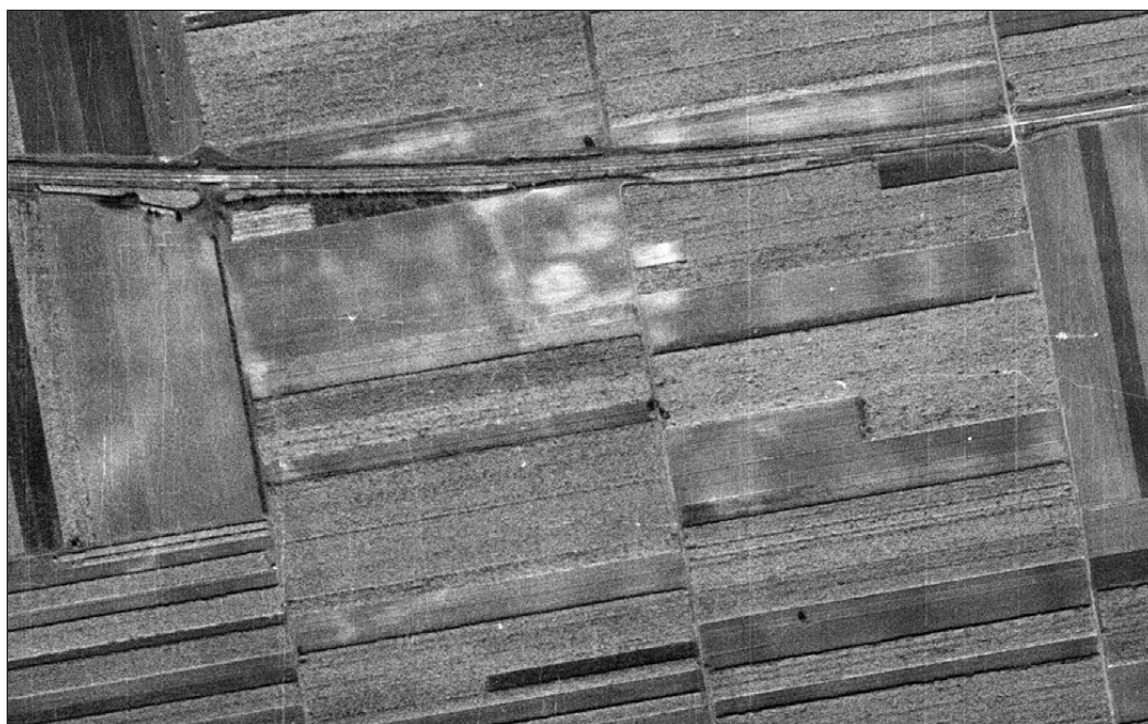


Fig. 10. Aerial photograph from the Military Geographical Institute from 1980

(source: Military Geographical Institute; edited by the author)

Сл. 10. Аерофотографија Војногеографског института из 1980. године (извор: ВГИ; уредио аутор)

soil marks, while autumn, despite low vegetation, is not suitable due to high soil moisture.

On the other hand, potential crop marks were also identified in several satellite images, particularly from July and August, although they were only faintly visible. The images from August 2010 (Fig. 9/2010) show structures not visible in the soil mark images. The main issue is the fact that most of the images were not taken under optimal conditions for recording archaeological remains. These partial results were valuable, as they suggested that crop marks could be observed.

Consequently, additional testing was carried out to determine the optimal flight window, using the Crop Monitoring digital platform. The analysis of Crop Monitoring data indicated that the most favourable period for observing soil marks is between late February and early March, when fields are bare, vegetation is absent, and the soil begins to dry. In contrast, crop marks are most visible during May and June, depending on the crop sowing schedule. Thus, the platform provided a valuable reference framework for predicting optimal flight timing and for identifying the part of the growing season most likely to reveal historical traces.

Following the initial analysis of satellite imagery and vegetation patterns, the next step of research focused on examining historical vertical aerial photographs from the archive of the Military Geographical Institute (VGI) dating from 1964, 1967, 1980, and 1995. Although these images were not originally produced for archaeological purposes and show visible physical degradation from long-term handling, they nonetheless provided valuable material for interpretation, as key archaeological structures remained detectable (Fig. 10). A notable limitation is the absence of precise capture dates. However, vegetation density and soil tone suggest that most photographs were taken during spring or summer, when both soil and crop marks may be visible in combination.

Due to low contrast and the absence of colour, the imagery required additional digital processing to extract meaningful details. Adjusting gamma levels, increasing contrast, and sharpening certain zones using the open-source software GIMP (GNU Image Manipulation Program, version 2.10), allowed key morphological patterns to emerge that would otherwise have remained undetected. These procedures represent



Fig. 11. Aerial photographs of the Solnok site, portraying different parts of the fortification and the types of crops in which they appear (photographs taken and edited by the author)

Сл. 11. Аерофотографије локалитета Солнок које приказују различите делове утврђења и типове усева у којима се трагови појављују (фотографисао и уредио аутор)

standard analytical practice in aerial archaeological interpretation, aiming to increase clarity and support accurate morphological assessment. Technical differences were also observed among these photographs: variations in scale, negative format, and image processing technology. Photographs from the 1960s were made using smaller negatives and contact prints (approx. 17–20 cm), while those from the 1980s were created on larger formats (up to 25 cm). Some of the material was analogue (black-and-white paper prints), while the rest had been digitized. In all cases, the photographs were monochromatic, unlike modern satellite imagery, which includes multispectral data.

Based on these analyses, it was confirmed that the Solnok site holds exceptional potential for the visual identification of archaeological features from the air, both as soil marks and crop marks. A detailed flight plan was, therefore, developed, defining not only the optimal periods for aerial survey but also the specific zones to be flown over, visited, and photographed. Since soil marks consistently proved more visible across all examined platforms, the decision was made to focus the flights primarily on detecting crop mark expressions, particularly in order to document features such as the tower-like structure visible in the Google Earth imagery (Fig. 9/2010). Consequently, this study presents aerial survey results from May and June, when conditions were most favourable for capturing crop mark details.

Aerial reconnaissance of the Solnok Site: Observation, and Documentation

During the flight, 154 oblique photographs were captured from different heights, distances, and angles, as the pilot adjusted altitude, viewing angles, and camera orientation across five circular flight paths based on real-time guidance, thereby producing a diverse and methodologically robust set of visual records (Fig. 12). This variability was crucial, as certain structures became visible only under particular perspectives or lighting conditions. All imagery was GPS-logged, archived immediately after landing, and noted on flight documentation sheets (Fig. 5), forming a controlled dataset for subsequent analysis.

The images revealed rectangular outlines, linear traces, darker tonal patches, and vegetation differences suggestive of subsurface archaeological remains. Local topography was also analysed during flight, as some structural features were more easily visible due to minimal elevation changes or surface variations.

Crop type and phenological stage had a significant influence on archaeological visibility. Across the Solnok fields, two types of corn and two types of wheat were identified. Industrial corn, with dense and low vegetation, generally reduced the visibility of subsurface features, while traditional corn, due to wider spacing and more pronounced plant structure, enabled clearer contrast and soil response detection. Similarly, wheat at different ripening stages showed varying capacities for revealing buried architecture – with mid- to late-ripening phases producing the strongest and most consistent archaeological signatures (Fig. 11).

Vegetation Structure and the Visibility of Archaeological Features

Rather than repeating crop characteristics, the key outcome of vegetation influence is observed directly in aerial results (Fig. 11). Archaeological visibility varied strongly across parcels, with ripening wheat providing the clearest linear and rectangular signals, while traditional corn also revealed alignments and circular forms where spacing allowed differential growth. Industrial corn remained least favourable, yet in optimal light even it produced detectable contrasts.

In one of the most revealing images (Fig. 11a), a circular feature is clearly visible in the lower central portion of a wheat field, interpreted as the foundation of a round tower. Extending from this point, two straight linear traces, presumably wall remnants, continue northward and eastward. These structures cross into an adjacent field planted with traditional corn, where tonal and textural contrasts indicate a continuation of ramparts. Along the eastern wall line, two rectangular structures are visible, likely towers integrated into the fortification. The architectural complex – round tower, connecting walls, and rectangular towers – is distinctly recognizable across multiple parcels. The wheat, observed in its late ripening stage, provided optimal crop mark visibility, while the mid-stage corn, with relatively low density, also allowed for effective interpretation.

Another photograph (Fig. 11b), taken over a central green strip, shows two parallel diagonal lines marked by darker tones. Along these lines, rectangular and square structures appear, interpreted as tower bases along a rampart. In the upper portion of the image, faint circular traces within a wheat field suggest an additional tower. The central strip was planted with traditional corn at a stage with strong pigmentation but adequate spacing for contrast detection. A lighter

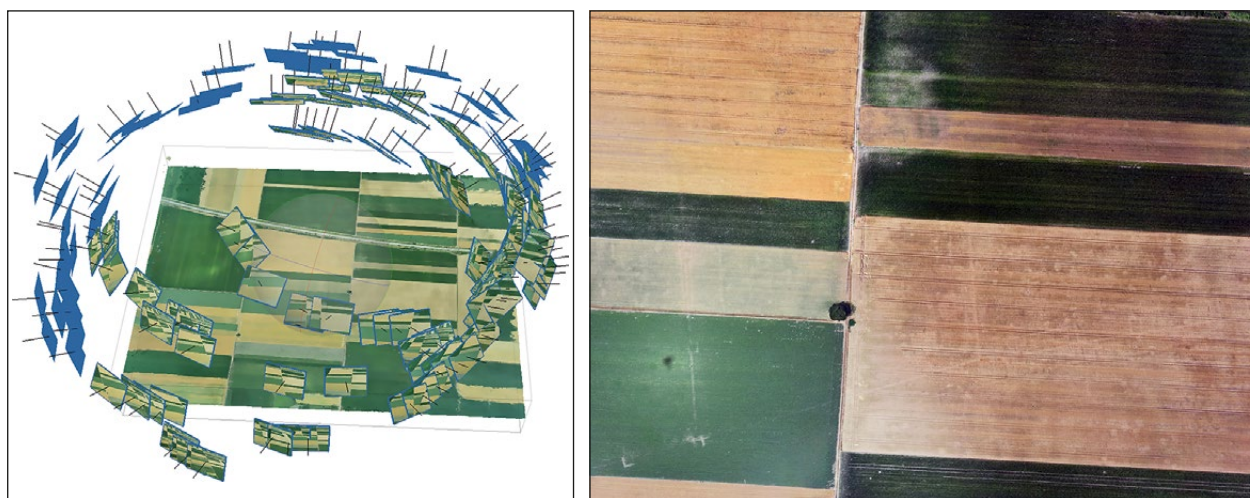


Fig. 12. Circular flight path and photo acquisition positions around the Solnok site, derived from photogrammetric processing of aerial images (left), and the detail of resulting orthophoto mosaic (right)

Сл. 12. Кружно кретање лета и позиције снимања фотоаерофотографија око локалитета Солнок, добијене на основу фотограметријске обраде аерофотографија (лево), и дејтаљ добијеног ортофото мозаика (десно)

zone below, covered with early-stage cereals, displayed the clearest expression of buried structures. Even the area with industrial corn – usually the least favourable – revealed detectable features due to advantageous lighting and strong contrast. Instead of presenting each photograph separately, the data was synthesized into a composite orthophoto (Fig. 12) with interpreted traces, supported by a photogrammetric model.

Photogrammetric Processing, Orthophoto Production and Oblique Image Rectification

Following the aerial reconnaissance, the dataset was processed using photogrammetric methods as well. All 154 oblique photographs were incorporated into a three-dimensional model generated in Agisoft Metashape Professional (Fig. 12, left). From this model, a georeferenced⁴² orthophoto (Fig. 12, right) was extracted using clearly recognizable ground control points, most notably the nearby railway line, which ensured precise spatial alignment.

Although the 3D model provided a useful visualization of the surface, it could not reliably be used for deriving a digital terrain model (DTM), due to the heterogeneous crop cover. Height differences between tall corn and shorter wheat introduced artificial topographic variation; therefore, photogrammetry was employed exclusively for orthorectification and not for

terrain modelling. The resulting orthophoto served as the base for spatial mapping and integration within a GIS environment.

Although the orthophoto provided a coherent spatial base, it did not capture all archaeological features with equal clarity. This limitation resulted from variations in camera angle, oblique perspective, and differences in crop height, meaning that certain structures visible in individual frames were only faintly expressed or entirely absent in the photogrammetric composite. For this reason, direct rectification of select oblique photographs was carried out, using the railway corridor and cadastral parcel boundaries as reference geometry. In several cases, these rectified images displayed architectural traces far more distinctly than the orthophoto itself. Consequently, final mapping and interpretation were based on a combined reading – integrating orthophoto data with high-quality oblique frames to ensure that all reliably visible structures were documented and transferred into the site plan.

⁴² Two coordinate systems were used to accommodate the differing reference frameworks of the source datasets: EPSG: 6316 – MGI 1901 / Balkans zone 7 and EPSG: 32634 – WGS / UTM zone 34N.

Interpretation and Mapping of Archaeological Features

Following the production of the georeferenced orthophoto and the rectified oblique photographs, all detectable traces were systematically mapped within a GIS environment. Linear features, circular forms, rectangular structures and tonal vegetation variations were digitised as vector layers and organised into analytical categories – wall alignments, towers, ditches, internal divisions, and potential road or gate lines. Mapping was carried out directly on the orthophoto and then cross-checked against corresponding oblique frames to ensure that each element represented multi-image confirmation rather than single-signal interpretation.

In addition to aerial photographs, the mapping process integrated data visible on satellite imagery and archival VGI photographs, allowing features that appeared consistently across independent sources to be reinforced, while isolated or weak expressions were treated with caution. These datasets were overlaid and compared progressively, enabling fragmented traces to be reassembled and extended across parcel boundaries. Wall lines identifiable in one field could, thus, be followed into neighbouring plots, and features that were faint in one medium were often clarified by another.

Through this multi-layered approach – combining orthophoto, rectified oblique imagery, satellite scenes and historical aerial photographs – the previously hypothesised layout of the fortification was refined, expanded and spatially stabilised. The result is the first coherent reconstruction of the Solnok fortification based on integrated remote sensing evidence (Fig. 13), forming a foundation for future comparison with excavation or geophysical results.

Discussion: New Results of Archaeological Interpretation of the Solnok Site in the Context of Previous Research

Starting from all available plans and cartographic representations of the site – from the first military survey of the Habsburg Empire (Fig. 8a) and Š. Ljubić (Fig. 8b) – it is necessary to establish a clear hierarchy of their reliability. The earliest plans, although valuable as evidence of initial interest in the site, are also the least authoritative. They provide only a general outline of what can be recognized as a fortification: a broad frame of its position, approximate form, and relationship to surrounding relief and communication

routes, based primarily on surface observations, limited excavations, and the study of historical maps. Due to their schematic nature and limited accuracy, they should be used only as a preliminary visual guide rather than as a basis for precise reconstruction. This is further supported by the fact that the published dimensions of the whole complex by Ljubić⁴³ ($322.4 \times 521.8 \times 385 \times 391.2$ m, with an estimated area of 16.2 ha), later repeated in other publications,⁴⁴ are incorrect. After georeferencing and precise measurement, the western rampart measurements presented in earlier plans are approximately 460 m rather than 521.8 m, the southern side around 270 m instead of 322.4 m, and the actual area is closer to 14 ha. A more reliable source is the plan produced by M. Petrović (Fig. 8c), based on partial excavations, although he too adopted Ljubić's original measurements. This documentation records archaeologically confirmed segments of ramparts and two towers, allowing it to be considered a moderately valid reference. However, the course of the remaining sections of the fortification wall was reconstructed on the basis of earlier plans, while the additional towers were positioned hypothetically and form part of the author's ideal reconstruction.

It remains unclear whether all the visible components were constructed within a single architectural programme or represent successive phases separated in time. This problem cannot be fully resolved with aerial imagery, and requires extensive archaeological excavations. Yet the new data provides an essential supplement to previous observations. In contrast to earlier interpretations, the plan offers a detailed and coherent reading of the fortification, identifying walls, towers, enclosed zones, and a continuous rampart line with significantly greater clarity (Fig. 13).

The most striking result is the dramatic increase in the recognized size of the site. In contrast to the previous plans, the newly identified features clearly demonstrate an eastward expansion of the fortification. While the western part (Fig. 13.1) corresponds to the area already known from earlier research, the eastern sector (Fig. 13.2) reveals an additional, substantial component of the site. This area may, in fact, consist of two distinct units, as a linear feature separating them could plausibly be interpreted as the remains of a fortification line or boundary wall. These results demonstrate that Solnok

⁴³ Ljubić 1883, 67.

⁴⁴ Petrović 1995, 221; Milin 2004, 262; Црнобрња 2020, 116.



Fig. 13. New site plan of Solnok, generated through integrated analysis of crop marks from aerial photographs and soil marks from satellite imagery (plan created by the author)

Сл. 13. Нови план локалитета Солнок, израђен на основу интегрисане анализе трагова на усевима са аерофотографија (црно) и трагова на земљишту са сателитских снимака (сиво) (план израдио аутор)

cannot be interpreted solely as a conventional *castrum*. Rather, it emerges as a multifunctional military-logistical complex, very likely incorporating a civilian or semi-civilian support zone. New measurements indicate dimensions of approximately $466 \times 678 \times 656 \times 260$ m, covering an estimated 26 hectares – twelve hectares more than previously assumed, and twelve hectares more when earlier measurement errors are accounted for. Numerous architectural elements are now clearly discernible. The number of confidently identified towers has risen to twelve, including both circular and rectangular forms. While the exact thickness of the walls cannot be determined without excavation – collapse layers obscure the original masonry – the fortification line can now be traced continuously.

Regarding the building layout within the complex, the analysis of aerial photographs and identified linear anomalies suggests the presence of approximately

twenty structures, although not all of them are equally well defined. In some areas, only fragmentary remains in the form of one or two wall lines are visible, while in other cases, with due caution, it is possible to reconstruct more complete building plans. This uneven level of preservation is most likely the result of post-depositional processes, long-term agricultural activity, and differences in construction techniques. Two larger rectangular buildings located along the inner line of the fortification stand out in particular, one situated in the northern and the other in the southern sector of the enclosed area. Their dimensions, elongated rectangular shape, and position adjacent to the fortification wall may indicate structures of a storage or logistical character, possibly *horrea* (Fig. 13.3).

The smaller structures and discontinuous wall remains distributed along the inner face of the complex wall most likely belong to auxiliary, service, or work-

shop buildings, forming a functional belt alongside the defensive system. Their irregular layout and modest dimensions suggest a secondary status in relation to the central urban or military areas.

The concentration of buildings in the eastern part of the complex, clearly visible along the inner face of the enclosure wall, can be explained, first and foremost, by defensive considerations. The area adjacent to the wall represented a strategically important zone during periods of heightened military threat. Buildings placed in this zone could support defensive system both functionally and spatially, while benefiting from the protection offered by the most robust architectural element of the settlement. In addition, the placement of structures along the walls reflects the rational use of limited space within the enclosed area. In settlements surrounded by defensive walls, the available interior space was finite, necessitating a clear functional hierarchy. Such an arrangement ensured the efficient organization of space and the smooth functioning of the complex as a whole. Finally, constructional factors also played an important role in this spatial pattern. These walls, being massive and structurally stable, provided a convenient support for adjacent buildings. In some cases, they may have been used as part of the load-bearing system, which reduced construction costs, shortened building time, and increased structural stability. This practical approach is well attested in Roman architecture and further explains the frequent occurrence of buildings aligned with the inner face of defensive walls. Taken as a whole, the observed architectural remains indicate an intensively used zone along the inner enclosure line, which played an important logistical, infrastructural, and defensive role in the functioning of the entire complex.

Beyond the numerical increase in recorded elements, the new imagery signals a qualitative shift in our understanding of the site. Aerial interpretation reveals a polycentric spatial arrangement, with annex zones extending eastwards from the main fortress – areas previously overlooked now appear integral to the defensive system.

Compared with satellite imagery (e.g., Google Earth), the new oblique photographs deliver far higher structural resolution. While satellite views hint at the complex outline, they do not allow identification of individual buildings. In contrast, the aerial photographs clearly show tower footprints and rampart lines, and enable precise measurement of architectural segments. This level of detail surpasses all previous

documentation and provides a more solid basis for hypotheses regarding development and function.

Nevertheless, a crucial element remains absent: stratigraphic data and absolute dating. Only systematic excavation of the entire complex can clarify the chronological sequence – distinguishing earliest construction from later expansion, reconstruction, or reuse. Until such evidence exists, it is most appropriate to view Solnok as a single fortification system developed across multiple phases, though these phases cannot yet be separated with confidence.

It is, however, possible to isolate the most strongly fortified zone – the western sector ($466 \times 260 \times 400 \times 260$ m) (Fig. 13.1), enclosed on all sides by ramparts reinforced with towers. By its architectural coherence and correspondence with Roman military engineering standards, this sector can be designated as the primary fortress – the core of the defensive system.

Other adjoining sectors (Fig. 13.2) are more difficult to define. Their weaker fortification suggests later addition, possibly as expansions of logistic capacity or as civilian-military settlements (*cannabae*) associated with the main fort. These areas are usually bordered by walls without towers; their layout lacks features expected of a fully developed *castrum*. They may represent supporting settlements or semi-open functional zones rather than primary defensive units, yet cannot be chronologically resolved without excavation.

In the aerial photographs, a zone adjacent to the walls of the entire complex can be discerned, which may represent a defensive ditch (Fig. 13.4). The width of this ditch is estimated at approximately 8–12 m; however, it must be emphasized that this measurement cannot be defined with precision for several reasons. The observed width includes not only the ditch itself, but also an associated erosion zone and/or embankment, as well as the effects of later land levelling, all of which tend to “blur” or spread the feature’s signature in aerial imagery. The presence of a dry defensive ditch surrounding the main enclosure conforms to established Roman military engineering practice and supports the interpretation of this area as the principal fortified nucleus. Particularly noteworthy, however, is the fact that this zone appears to extend across the whole complex, as indicated by traces visible in the western, southern, and eastern parts of the site. The fact that the entire complex was enclosed by a ditch may point to several important functional and chronological aspects. Enclosing the whole complex suggests that the site was not intended to protect only a single core area, but

that the complex as a whole possessed strategic or military significance. This, in turn, may indicate a need for controlled access and an increased concern for security at the time of its construction or use. The extension of the ditch around the western, southern, and eastern parts of the complex may reflect a perceived threat from multiple directions or the need for a clear spatial demarcation in an unstable frontier or transit zone. Furthermore, the enclosure of the entire complex implies that a variety of functions – residential, storage, or working – were accommodated within the protected perimeter and needed to be defended as a unified entity, going beyond a narrow interpretation of the site as an isolated fortress. Finally, the ditch following the full perimeter of the complex may support the interpretation that the area was conceived, at least in part, as a coherent and integrated plan rather than as the result of successive expansion with later additions of fortifications.

A particular issue is the rectangular unit visible in early plans at the north-eastern perimeter (Fig. 8; Fig. 13.5). It is important to note here that this structure is more clearly visible on satellite imagery, specifically through soil marks. It does not appear clearly in aerial imagery that has been recorded, only in topography, likely due to the absence of stone remains. As previously mentioned, Petrović proposed that an earlier defensive perimeter of earth-and-palisade construction preceded the later stone fortification. This interpretation rests on morphological differences in certain rampart sectors, lacking late antique monumental features – possibly reflecting the earliest enclosure. Parallels with other Roman sites support such a developmental pattern: an initial palisade-and-earthwork phase evolving into a later stone wall system. While possible, the precise relationship between this north-east part and the main fortress remains unresolved. It is possible that this was a small, independent fortification that predated the construction of the larger fortress and was, or not, later incorporated into the wider defensive system. However, it is equally plausible that it was built after the destruction of the main fortification, representing a smaller, subsequent phase of defensive reorganization. A third possibility is that this square unit was constructed simultaneously with the rest of the fortress, functioning as an annex *castellum* – a space intended for military supplies. None of these scenarios can be preferred without future excavation.

For the purposes of interpretation and publication, emphasis must remain on what can be stated with cer-

tainty. The fortification is clearly defined in plan, measurable in extent, and characterized by ramparts with towers, allowing the identification of a primary defended enclosure constructed according to Roman military-engineering principles. All other sectors attached to the core fortification must remain interpretative proposals – logical, but not conclusive.

Integration of all newly identified features within a GIS framework highlights the broader strategic role of the site. Positioned along the *Sirmium–Bassianae* route (Fig. 7), with likely links toward the Danube, Solnok should not be considered an isolated installation, but rather a component within the infrastructural network of Roman Sirmium.

In summary, the new orthophotographic interpretation not only corrects earlier measurements, but redefines Solnok as a large, polyphase, multifunctional Roman complex. Its architectural and topographical coherence reveals a major military-logistical node in southern Pannonia, significantly informing our understanding of castrametation and the organization of Roman military infrastructure in the interior of the province.

Conclusion

The research presented in this study has demonstrated that the methodological approach – encompassing preparation, planning, execution, processing, and interpretation – clearly confirms that aerial photography in archaeology is not merely a tool for site discovery, but a system of observation, analysis, and spatial reasoning. This process transforms images into evidence, patterns into hypotheses, and visual anomalies into meaningful archaeological insights. In the context of Serbian archaeology, where remote sensing methods are still rarely applied, although their use has increased noticeably over the past decade, the approach showcased here offers a clear and replicable strategy for improving research practices and heritage protection projects. This confirms the role of aerial photography as an active analytical tool in archaeological research. The study also demonstrated that the method can be effectively applied in lowland areas such as Vojvodina in Serbia, where surface traces are often obscured by intensive agriculture and decades of development.

Beyond academic contributions, it is important to emphasize the practical significance of the results obtained at Solnok for heritage management. The updated plan and precisely defined site boundaries should be

included in official records, while areas with high archaeological potential – particularly those beyond previously assumed limits – must be considered when planning future land use and protection measures. This is especially important in regions subject to intensive land cultivation or urban expansion.

As the project moves forward toward broader comparative analysis and synthesis, Solnok remains a key example – not only for what was discovered but for

how these discoveries were made. It confirms that aerial photography, when applied methodically and contextually, can contribute not only to a better understanding of individual sites but also to the redefinition of archaeological practice in Serbia as a whole. The author of this study, therefore, argues that the systematic use of aerial photography should be institutionalized through research and conservation strategies, as well as through educational programmes and professional training.

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Резиме: АЛЕКСАНДАР СТАМЕНКОВИЋ, Републички завод за заштиту споменика културе, Београд

ЗНАЧАЈ ИНТЕРПРЕТАЦИЈЕ АЕРОФОТОГРАФИЈЕ У СРПСКОЈ АРХЕОЛОГИЈИ НА ПРИМЕРУ ЛОКАЛИТЕТА СОЛНОК У СРЕМУ

Кључне речи. – аерофотографија, сателитски снимци, Срем, Солнок, римска фортификација, *Caput Bassianense*

Полазећи од чињенице да је употреба аерофотографије у српској археологији и даље спорадична и најчешће условљена индивидуалним истраживачким иницијативама, а не институционалним програмима, рад има два основна циља. Први је да представи јасан, поновљив и методолошки утемељен радни ток за примену аерофотографије у археолошким истраживањима, прилагођен специфичностима низијских, интензивно обрађиваних предела какви доминирају у Срему. Други циљ је да се кроз детаљну студију случаја покаже како такав приступ може произвести нова сазнања чак и на локалитетима који су већ познати и делимично истраживани. Као студија случаја издвојен је археолошки локалитет Солнок у Срему, идентификован као римско утврђење *Caput Bassianense*.

Методолошки оквир истраживања обухвата више фаза: припремну анализу и изградњу ГИС базе података, анализу сателитских снимака и архивских аерофотографија, планирање и спровођење циљне аерофотографске проспекције, као и обраду, архивирање и интерпретацију прикупљених података. Истраживања су заснована на интегрисаном приступу који обједињује сву поменућу грађу ради унапређења документације, интерпретације и разумевања археолошке слике Срема. Посебна пажња посвећена је одређивању оптималног временског оквира за снимање, помоћу индекса вегетације и влаге (NDVI и NDMI), чиме је омогућено прецизније препознавање периода погодних за уочавање земљаних и усеvnих маркера.

На примеру археолошког налазишта Солнок овакав приступ показао се као изузетно ефикасан. Анализом аеро-

фотографија и њиховим интегрисањем са сателитским и архивским подацима омогућена је детаљна реконструкција просторне организације римског утврђења, при чему су јасно идентификовани бедеми, куле, унутрашње грађевине и могући одбрамбени јарак. Посебно значајан резултат представља сазнање да се комплекс простире на знатно већој површини него што се раније претпостављало. Док су старије интерпретације говориле о утврђењу површине око 16 ха, нова анализа указује на комплекс од приближно 26 ха, са јасним доказима источног проширења и сложенију просторну организацију. Резултати истраживања сугеришу да Солнок не треба посматрати искључиво као стандардни римски *castrum*, већ као вишефункционални војнолoгистички комплекс, који је највероватније укључивао и цивилну или полуцивилну пратећу зону. Иако интерпретација фотографија из ваздуха не може заменити стратиграфска археолошка ископавања нити омогућити прецизно раздвајање грађевинских фаза, она пружа неопходан просторни оквир и нову интерпретативну основу за будућа теренска истраживања.

Поред научног доприноса, рад наглашава и значај добијених резултата за заштиту и управљање културним наслеђем. Прецизније дефинисане границе локалитета и идентификација до сада непознатих археолошких зона имају директне импликације за просторно планирање, пољопривредну праксу и мере заштите. У ширем контексту, истраживање потврђује да аерофотографија, када се примењује систематски и методолошки доследно, представља моћан аналитички алат који може знатно унапредити археолошку праксу у Србији.

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MULTIPLE ROMAN MILITARY CAMPS AT KLISINA NEAR ANCIENT SIRMIIUM

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Abstract. – As part of a comprehensive archaeological survey of the area around the site of Glac in the north-west of Serbia, a detailed examination has been undertaken of the pattern of occupation in the vicinity of Klisina, an area north-east of Sremska Mitrovica (ancient Sirmium). The research question is posed as to whether remote sensing data from the area, archaeological finds collected in the field survey, and ancient written sources indicate the existence of remains of multiple Roman military camps at Klisina. A comparative study of Roman military camps, with their analogous features recognized in the field is undertaken.

Key words. – Castra, Castrum, Glac, Klisina, Roman camps, Roman fortifications, Sirmium

The Glac Survey is an archaeological survey project that commenced in 2017 in the north-west of Serbia, in the vicinity of Sremska Mitrovica, as a joint Australian and Serbian programme and is now an independent project. The Glac Survey Project is directed to identifying the spatial and temporal settlement patterns during the Roman period in the vicinity of ancient Sirmium and their environmental and economic context. The area subject to the archaeological survey has been defined as the Glac Study Area. It encompasses the territory around the Glac site, including a part of the Srem region north and north-east of the Sava river, and a part of the Mačva region south and south-west of the river, covering approximately 700 km² (Fig. 1). In Antiquity, the Study Area was within the Pannonia Inferior province, and in the late Roman province of Pannonia Secunda, around the Roman city of Sirmium and adjoining the territory of Bassianae.

As part of the Glac Survey in the 2023 and 2024 field seasons, a detailed examination was undertaken of the pattern of occupation in the vicinity of Klisina, an area north-east of Sremska Mitrovica, east of the

Sremska Mitrovica – Ruma road, and south of the railway line from Belgrade to Šid (Fig. 2). The Klisina area is noted for a central vegetated mound surrounded by a circular deep water-filled moat and an external circular mound. The area outside of the moated area is flat with intensively ploughed and cropped farmland, primarily for wheat and maize (Fig. 3).

The area outside the moated area is intersected by a buried gas pipeline that cuts from south-west to north-east through the field only 10 m north-west of the external mound of Klisina.

Klisina is located with the Fan Srem Land System, just 30 m north of the boundary of the River Terrace Land System and Fan Srem Land System (Fig. 4).¹

The site has not been archaeologically excavated, but surveyed. In a letter to the Archaeological Museum

¹ A study on geomorphology and Land System Analysis of the Glac Study Area was specially commissioned by the Geographical Institute “Jovan Cvijić” of the Serbian Academy of Sciences and Arts, in Belgrade; the study was completed under the leadership of Dr Jelena Čalić in 2018–2020.

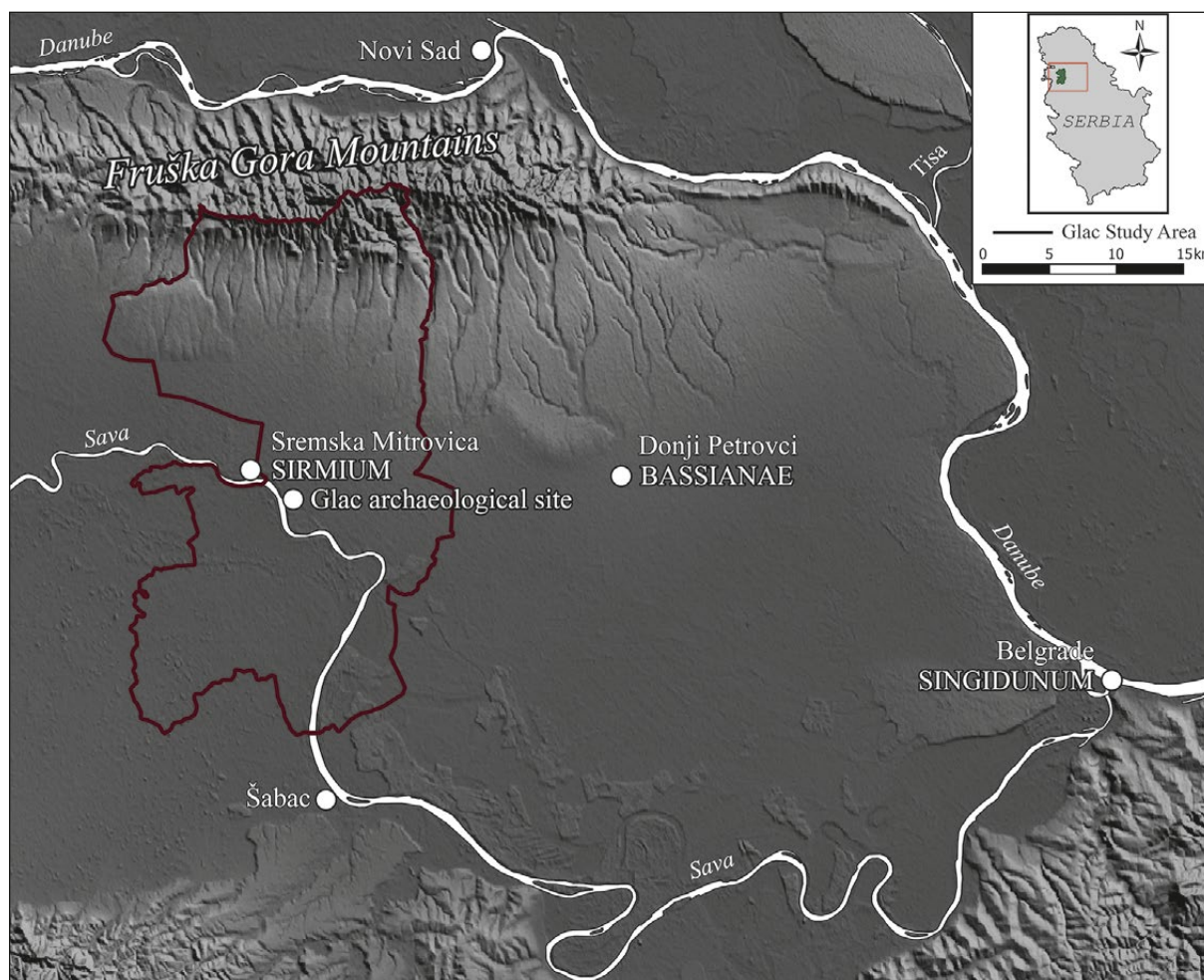


Fig. 1. The Glac Study Area

Сл. 1. Истраживачко подручје пројекта „Глац“

in Zagreb from 1889, it was briefly mentioned by Ignjat Jung as being a Roman fortified site near an ancient road; Jung noted it was 50 m in diameter and was surrounded by a moat, with the total width of the site being 100 m.² Jung also noted that there were structures made of stone, but prior to 1889 many of the pieces were taken to Šašinci by the local inhabitants.³ Jung could not determine if any inscriptions were found at the site.⁴

In 1940, an entirely preserved “jug”, made of yellowish clay and dated to the Roman period was excavated at Klisina by D. Mihajlović, a postman from Šašinci; the vessel was placed in the Museum of Srem (no. 453).⁵

In 1967, Klisina was surveyed by D. Popović of the Institute for the Protection of Cultural Monuments, in Sremska Mitrovica, and P. Milošević of the Museum

of Srem.⁶ The site was described as measuring 120 m in diameter, including a Roman fortification situated next to a Roman road, with some Late Iron Age (“Celtic”) finds and also medieval finds.⁷

On the basis of these surveys and the Roman finds being present at the site, in a recently published work, A. Crnobraja also described Klisina as a Roman fortification situated next to an ancient road.⁸

² Jung 1890, 26, 27.

³ Jung 1890, 26.

⁴ Jung 1890, 26.

⁵ Popović 1967c, 1.

⁶ Popović 1967b, 4; Popović 1967d, 179.

⁷ Lučić 2016, 52; Popović 1967a, 6. Popović 1967b, 4. Popović 1967d, 179.

⁸ Crnobraja 2020 [2015], 104, 117, 118, 189.



Fig. 2. Location of the Klisina site northeast of Sremska Mitrovica

Сл. 2. Позиција локалитета Клисина североисточно од Сремске Митровице

The maps of the Habsburg monarchy of all three military surveys (produced in 1780, 1865–1869, and 1872–1884) do not record the toponym Klisina, but refer to the area south of it, which was named Mandjeloska Bara (“the pond of Mandjelos”) and Jezero (“a lake”), suggesting this area was occasionally flooded.⁹ In the letters of Ignjat Jung from 1889 and 1904, the site was referred to as “Klisina”, and “Vienac” (“a wreath”).¹⁰

The word Klisina is augmentative of the word Klisa, with the added suffix *-ina*. The Klisa toponym has been noted in several regions of the Balkan Peninsula and the Pannonian Plain, including Srem with at least three places being named Klisa.¹¹ In Srem, R. M. Grujić found the toponym Klisa at Sremski Karlovci being noted in 1745 and referring to both a hill and the remains of a church; a small hill in the village of Ledinci, situated near a church; and a farm (pusta) near the village of Bobote, where a 2nd century CE altar of Jupiter was found and a small church once was situated.¹² However, Grujić did not note the augmentative

of Klisa that is Klisina near Sremska Mitrovica, despite the toponym being mentioned before in the letters of Jung and reports of Ljubić, from 1890 and 1904.¹³ However, the map of the Third Cantonal Survey of the Habsburg Monarchy records the toponym “Klisina” in Srem, south-east of Sremski Karlovci, as a field and a small river cutting through the field (“Klisina Bach”); and the toponym “Uklisu” south-east of the village of Putinci.¹⁴ Grujić concluded that despite the toponym Klisa often referring to a hill, it usually refers to a

⁹ Kantonai felmérés I. 1763–1787; Kantonai felmérés II. 1865–1869; Kantonai felmérés III. 1872–1884.

¹⁰ Jung 1890, 26, 27; Ljubić 1890, 26, 27; Miladinović-Radmilović, Radmilović 2015, 58.

¹¹ Grujić 1935.

¹² Grujić 1935, 227, 228.

¹³ Jung 1890, 26, 27; Ljubić 1890, 26, 27; Miladinović-Radmilović, Radmilović 2015, 58.

¹⁴ Kantonai felmérés III. 1872–1884.



Fig. 3. The Klisina site photographed from the north

Сл. 3. Локалитет Клисина фотографисан са северне стране

church or church remains,¹⁵ being derived from the Greek word *ἐκκλησία*.¹⁶ Tradition also relates it to the meaning of a small hill or a hill. It is of significance for our purpose that in Ancient Greek the word *ἐκκλησία* refers to an assembly of either citizens or soldiers, and also to a meeting point; in Latin *ecclesia* refers to a church and also to an assembly.¹⁷

The Glac Survey work at Klisina included detailed mapping of the current and former features and crop marks using historical map sources, satellite imagery from Google Earth, modern topographical mapping, as well as LiDAR imaging and low-level aerial photography specially commissioned by the Glac Survey in 2020.

Analysis of the remote sensing imagery identified a series of often overlapping and intersecting linear crop marks, some of which appear to form rectangular enclosures in the area north, north-west, north-east, and

east of Klisina, forming a focus for field work in 2023 and 2024 (Figures 5, 6, 7).

The field work included extensive field walking and intensive field surveys involving the collection, counting, and weighing of all surface material (ceramics including pottery, bricks and tile, stone, and metal) in 27 squares measuring 20 x 20 m, within 3 grids of 100 x 100 m, in the Klisina area. The grids are defined in the Glac Survey GIS (Fig. 8).

There are indications in ancient sources of the existence of Roman military camps east of Sirmium and considerable speculation in modern historical and archaeological literature of the existence of such camps,

¹⁵ Grujić 1935.

¹⁶ Grujić 1935, 227, 228.

¹⁷ Lewis, Short 1879, 624; Liddell, Scott 1996, 509.



Fig. 4. Position of Klisina in relation to the Land System Units

Сл. 4. Позиција Клисине у односу на геоморфолошке целине

but to date the location of such camps has not been discovered.

The research question posed is whether these crop marks near Klisina form part of the ditches or other structures of Roman military camps. Furthermore, given the proximity of these features to the moated area, they raise the question that if the crop marks indicate Roman military camps, are they related to the moated area and what was the function of the moated area. This paper primarily addresses the question of whether these crop marks form part of the ditches of Roman military camps, and their significance. The further questions regarding the nature of the moated area and its relationship to any military camps are part of ongoing investigations by the Glac Survey and will only be briefly adverted to here.

The significance of any finding of the high concentration of Roman military camps east of Sirmium relates to an understanding of force disposition in and

around ancient Sirmium and in the mid-Danubian sector in the high empire and Late Antiquity as part of frontier defence during the Roman period, and an understanding of force accompaniment in the presence of emperors in Sirmium and of military campaigns in Pannonia, often led by the emperors themselves.

Roman military camps of Sirmium in ancient sources

An examination of ancient written sources, including literary sources and inscriptions, was undertaken to identify any that either directly and indirectly suggest the existence of temporary military camps in the proximity of Sirmium.

In June 174 CE, the main Pannonian base of Marcus Aurelius was in Sirmium, where he was, for the seventh time, recognised as the *imperator* after his victory over the Quadi, and his wife Faustina, who followed the emperor in the military campaign, was

granted the title of *Mater Castrorum* – “The Mother of the Camp(s)”.¹⁸ The event and the novel title, used for the first time in the Roman history,¹⁹ is known from coinage,²⁰ noted by Dio Cassius,²¹ and was recorded in the *Historia Augusta*.²²

The title was noted as including either the word *stratopedon* (τῶν στρατοπέδων) or the word *castrorum*, and relates to military camps associated with Sirmium.

About a decade after Dio Cassius noted the title of “μήτηρ τῶν στρατοπέδων”,²³ in the 240s, Herodian of Antioch described the deathplace of the emperor and philosopher Marcus Aurelius.²⁴ In the context of the death of the emperor, Herodian noted in his first book the existence of a military camp – *stratopedon* in a military assembly field – *pedion*.²⁵

Tertullian of Carthage recorded in 197 that the emperor had died on 17th March 180.²⁶ The location of the event was recently examined, with Sirmium identified as the deathplace of Marcus Aurelius.²⁷

The description of the deathbed scene of Marcus Aurelius by Herodian was criticized by Alföldy.²⁸ However, leaving aside the deathbed scene, Herodian’s account of the deathplace should be considered in more detail given that the deathplace was identified as Sirmium.²⁹

Herodian also noted in his seventh book that the emperor Maximinus I Thrax spent the winter of 238 CE in Sirmium, where he prepared for a military offensive the following spring.³⁰

Written at about the same time as Dio and Herodian, an indirect account of the existence of military structures near Sirmium was implied by Philostratus who, in his *Lives of the Sophists*, described the trial to Herodes Atticus in 170 in the imperial residence in Sirmium; he gives an account on the surroundings of the city with numerous towers and half-towers that were erected in the suburbs: “πύργοι”, “ἡμιπύργια”.³¹

A further suggestion of the existence of a military facility near Sirmium is indicated in an inscription that was discovered on 24th April 1781, in Sremska Mitrovica, at the place where an orthodox church was later built in the city centre.³²

The inscription was published by Mommsen in 1873 and also by Dessau in 1892.³³

The votive inscription from Sirmium dedicated to *Iuppiter Monitor* noted the presence of *vexillationes* – the detachments of legions or mobile troops from Germania and Britannia, as well as their auxiliary or support units; this has been related to the cavalry being stationed in Sirmium or near the city in the time of

Gallienus (253–268 CE) under the command of *praepositus* Vitalianus.³⁴ It has been dated to the period of the emperor’s sole rule after 260;³⁵ probably produced after his edict, which has been dated to 262 or 260.³⁶

Almost a century later, a milestone produced for Constantius II indirectly suggests the existence of a military camp near Sirmium. It was not found in situ in the field, but in Sremska Mitrovica in 1867, and it was taken to the Kunsthistorisches Museum in Vienna in 1868; the milestone was dated to 354–355, and it records a distance of 5 Roman miles from (to) Sirmium.³⁷

This milestone was installed as part of the road repairs by the emperor and carries an inscription detailing a complete list of all of his titles; according to the inscription, every five miles there was a milestone set between Atrans (Trojane in Slovenia) and the mouth of the Sava river (between Confluentes in New Belgrade and Singidunum in the old part of the modern city) along the 346-mile-long road.³⁸ The inscription at the top unusually includes the text: “*milia passum V*”, and Mirković suggested that it was originally erected on the *via militaris*, 5 Roman miles east of Sirmium.³⁹

¹⁸ Birley 2001, 178; 2008, 176; Burche 2020, 133–135; Speidel 2012, 127, 128.

¹⁹ Speidel 2012, 127, 128.

²⁰ Burche 2020, 133–135. Speidel 2012, 145, 147, 148.

²¹ Dio LXXII.10.5; Carry 1955, 32, 33.

²² *Historia Augusta, Marcus Antoninus* 26.8; Birley 1976, 134; Geoff 2012. The word *aestiva, orum, n*, meaning both a war campaign and a camp.

²³ Dio LXXII.10.5; Carry 1955, 32, 33.

²⁴ Herodian, I.5.1–8; Bekkero (ed.) 1855, 8; Echols 1961.

²⁵ Herodian, I.5.1–2; I.5.8; Bekkero (ed.) 1855, 8, 10; Echols 1961.

²⁶ Tertullian, *Apologeticum* XXV. 4–6; Glover, Rendall 1977, 136, 137.

²⁷ Dimitrijević, Prica 2023.

²⁸ Alföldy 1973.

²⁹ Dimitrijević, Prica 2023; Geoff 2013, 282, 283.

³⁰ Herodian VII.2.9; Echols 1961.

³¹ Kovács 2009, 233; Mirković 2017, 35, 72, 79–82; Philostratus II.1 [560, 561]; Wright 1922, 168–173.

³² Dessau 1892, 130; Mommsen (ed.) 1873, 418.

³³ Mommsen (ed.) 1873, 418 (*CIL* III no. 3228); Dessau 1892, 129, 130 (no. 546).

³⁴ Alföldi 1939, 214; Luttwak 2016, 212; Mirković 2017, 66, 67.

³⁵ Alföldi 1939, 214.

³⁶ Lo Cascio 2008, 160; Mirković 2017, 154.

³⁷ Chevallier 1976, 42; Mirković 2017, 232, 233 (*CIL* III 10617=3705; *ILS* 732).

³⁸ Chevallier 1976, 42.

It is inscribed in the nominative case and clearly indicates an active role of the emperor in the road repairs in 354–355. In relation to this date, information from Zosimus, in the *Historia Nova* written by 518, indeed suggests that Constantius II was in Pannonia at the time before he went to Italy in 355.⁴⁰ Additionally, the date precedes the emperor's speech in a military camp near Sirmium in 358, which was recorded by Ammianus Marcellinus (see further below).⁴¹

What makes the milestone interesting is that it was made of white marble, which is a unique case in Roman Pannonia; the text was framed, the top line unusually indicates a distance of 5 miles, and there is a complete list of the emperor's titles with the embellishments of the traditional form of address.⁴²

As Chevallier concluded, all this points to an unnecessary luxury expressed on the milestone. This is even more notable given that the milestone was set up some distance from Sirmium.⁴³ Evidently, it was originally set in a place of significance at the time, in the proximity of the city.

In the Summary of Roman History by Eutropius (*Breviarium Historiae Romanae*), written in the late 370s CE, it was noted that the emperor Probus was killed near Sirmium in an iron tower.⁴⁴ The passage suggests the existence of an iron lookout tower near Sirmium, likely in relation to a temporary encampment of the army; this was in fact later suggested in the Chronicle of St. Jerome, the *Historia Augusta*, and *Epitome de Caesaribus*.⁴⁵

The previously mentioned description of a military camp in a military assembly field near Sirmium by Herodian corresponds to a similar description by Ammianus Marcellinus in his *Res Gestae*, written in the 380s CE, where he noted the existence of a military camp next to the city in the mid-4th century.⁴⁶ The passage of the *Res Gestae* refers to a victory of the emperor Constantius II over the Quadi and the Sarmatians in 358; Ammianus Marcellinus clearly noted there was a military camp with tents – “*tentoria*” in these military quarters – “*sedes*”, in the proximity of Sirmium. The emperor delivered his speech to the army in the camp, after which he went to a palace – “*ad regiam*” to rest for two days before he entered the city of Sirmium.

The reference of Marcellinus to a *tentoria* and/or *sedes* that was situated near Sirmium in the mid-4th century points to an area where the assembly field and the military camp mentioned by Herodian could also have been located in the 2nd century during the stay of Marcus Aurelius in the city.

As suggested by Mirković, the palace outside the city walls where Constantius II had two days rest before entering the city of Sirmium must have been the one the emperor Maximian Herculus built in the early 4th century near the city.⁴⁷ The palace that was also mentioned almost a century after it was built in the *Epitome de Caesaribus*,⁴⁸ was discovered at the archaeological site of Glac, situated 4 km south-east of Sremska Mitrovica. During the excavation campaign in 2018 at the site of Glac, two bronze coins of Constantius II were unearthed, found within the early 4th century architectural structure. These finds may confirm the information of Ammianus Marcellinus and the suggestion of Mirković that Maximian's palace was also used in the time of Constantius II. This also fits well with the likely position of a camp east of the city and consistent with the milestone of Constantius II described above.

Ammianus Marcellinus further recorded the existence of a military headquarters in Sirmium in the context of the struggle for power between the emperors Constantius II and Julian the Apostate in 361 CE.⁴⁹

Marcellinus further describes the emperor Julian entering Sirmium in 361 CE; the mention of “forces as regard for speedy action allowed to be summoned from the neighbouring stations” and a “crowd of soldiers” by Marcellinus suggests their presence in the proximity of the city. The information becomes more significant when viewed in the light of Zosimus' *Historia Nova*, written in around 518 CE; Zosimus noted that Julian raised an additional army contingent when he reached Sirmium in 361 (see below).⁵⁰

³⁹ Mirković 2017, 72.

⁴⁰ Zosimus, *Historia Nova*, III.1; Ridley 2006 [1982], 49.

⁴¹ Ammianus Marcellinus, *Res Gestae* XVII.13.27–29; XVII.13.33; Rolfe 1935, 396–401.

⁴² Chevallier 1976, 42; Mirković 2017, 72.

⁴³ Chevallier 1976, 42.

⁴⁴ Eutropius 10.5; Bird 2011.

⁴⁵ Chronicle of St. Jerome, 265th Olympiad; Fotheringham 1905; Pearse 2005. *Historia Augusta*, *Probus* 21.1–4; Magie 1932, 379–381. *Epitome de Caesaribus* XXXVII.4; Banchich 2018.

⁴⁶ Ammianus Marcellinus, *Res Gestae* XVII.13.27–29; XVII.13.33; Rolfe 1935, 396–401.

⁴⁷ Mirković 2017, 39, 72.

⁴⁸ *Epitome de Caesaribus*, XL.10; Banchich 2018.

⁴⁹ Ammianus Marcellinus, *Res Gestae*, XXI.9.5–6; Rolfe 2000 [1940], 130–133.

⁵⁰ Zosimus, *Historia Nova*, III.10–11; Ridley 2006 [1982], 55, 173.

In 395 CE the *Historia Augusta* noted that the emperor Probus (276–292 CE) initiated land reclamation from the numerous swamps east of Sirmium by the army digging a channel and that the emperor was later killed by the troops.⁵¹

The existence of an iron tower near Sirmium in the context of the death of the emperor Probus in 282 CE was also noted in the late 390s in the *Epitome de Caesaribus*, written by an anonymous author (often erroneously attributed to Aurelius Victor).⁵² Another suggestion regarding the existence of a military camp was noted in the *Notitia Dignitatum* (“The List of Offices”), written by an anonymous author in the late 4th early 5th century.⁵³

An indirect suggestion of the existence of an army contingent at Sirmium or in its immediate proximity in the 360s was suggested by Zosimus in his *Historia Nova*, written around 518 CE, where he noted that when reaching Sirmium in 361, Julian raised an additional contingent of the army at that place.⁵⁴ Zosimus further recorded, describing the events leading up to the death of Julian in 363, that a contingent of Batavi guarded the city of Sirmium.⁵⁵

The references from Herodian in relation to the accession of Commodus in 180 and from Ammianus Marcellinus in relation of Constantius II in 358 provides clear and incontrovertible evidence for the existence of military camps near Sirmium spanning a period of two centuries, while the excerpt from Ammianus Marcellinus strongly suggests that the camp he refers to was located east of Sirmium. The other sources are largely indirect and inferential, but when combined are further suggestive evidence for the existence of Roman military camps near Sirmium.

Roman Military Camps near Sirmium in Modern Archaeological Literature

The existence of a Roman military camp in Sirmium has been considered in modern literature since the 19th century, with the earlier authors usually being focused on identifying legions that may have been stationed in the city, based on literary sources.⁵⁶

More recently, the main research focus was on the question if, in addition to the partially archaeologically researched city fortifications of Sirmium, which existed from the 1st to the 6th century,⁵⁷ there was also a military camp at or near Sirmium in the early stage of the city’s development. As reviewed by Vujović, two main hypotheses have been considered in this respect.⁵⁸

The first hypothesis suggests that a military camp existed in the early days of Sirmium, from which the city developed by *deductio*, the settling of military veterans in the time of the Flavians when the city gained the status of a Roman colony.⁵⁹

The presence of troops in Sirmium in the time of the *Bellum Batonianum* (6–9 CE) and throughout the 1st century was initially suggested by Mommsen, who concluded that some military camps in this part of Pannonia remained for some generations and were later moved towards the north, with the city of Sirmium receiving urban rights under the Flavians.⁶⁰

A similar conclusion was reached by Klemenc,⁶¹ and also Mócsy who, on the basis of Cassius Dio’s information, suggested that a Roman garrison stationed in Sirmium was attacked at the beginning of the “Batonian War”.⁶²

During earlier archaeological research of Sirmium, V. Popović hypothesized that a military camp could have existed in the northern part of the city.⁶³ The hypothesis was later repeated by M. Jeremić,⁶⁴ and considered by M. Vujović.⁶⁵ It has been suggested that the position of the northern part of Sirmium, its altitude, the orientation, and planimetry of the ancient streets are reflections of a military camp pattern, from which the city developed.⁶⁶

⁵¹ *Historia Augusta, Probus* 21.1–4; Magie 1932, 379–381.

⁵² *Epitome de Caesaribus* XXXVII.4; Banchich 2018.

⁵³ *Notitia Dignitatum, Oc.* XXXII.49, 50; Seeck (ed.) 1876, 190; Mirković 2017, 71.

⁵⁴ Zosimus, *Historia Nova*, III.10; III.11; Ridley 2006 [1982], 55, 173.

⁵⁵ Zosimus, *Historia Nova*, III.35; III.36; Ridley 2006 [1982], 68–69, 184.

⁵⁶ Alföldi 1939, 214; Alföldy 1959, 122; Graf 1936, 54; Gündel 1895, 42; Luttwak 2016, 212; Mirković 2017 [1971, 2008], 63; Ritterling 1924, 1444; Vujović 2021.

⁵⁷ Jeremić 2016, 127–156, Fig. 19–21; Milošević 2001, 61–69; Popović 1971.

⁵⁸ Vujović 2021, 150, 151, and further.

⁵⁹ Mommsen 1996 [1885], 39–41, 206; Mócsy 1974, 43; Vujović 2021.

⁶⁰ Mommsen 1996 [1885], 39–41, 206.

⁶¹ Klemenc 1961, 23; Klemenc 1963, 67; Vujović 2021, 149.

⁶² Mócsy 1974, 43, 369; Dio LV.29.1–4. In Dio’s words, the insurgents attacked “Romans”.

⁶³ Popović 1971, 121, 122, 132, 137.

⁶⁴ Jeremić 2016, 160, 161.

⁶⁵ Vujović 2021.

⁶⁶ Jeremić 2016, 160, 161; Popović 1962, 111, 112; Popović 1971, 121, 122, 132, 137; Vujović 2021, 152–154.

In this respect, Vujović suggested that there must have been an early Roman imperial garrison in Sirmium.⁶⁷ This conclusion is derived from the writings of Velleius Paterculus and Cassius Dio, the position of the north part of the city with its street pattern, and remains of early fortification structures that have been archaeologically recorded.⁶⁸ Detachments of legions (*vexillationes*), such as one from XIII Gemina, even participated in the construction of the city walls.⁶⁹ It was assumed that the city would not survive the attacks of the Pannonian insurgents in 6–9 CE without the presence of well trained and equipped troops.⁷⁰ Nevertheless, no clear archaeological evidence has been found, and the question is open to debate.

Furthermore, the massive Roman era wall found at the tell of Kalvarija in the eastern periphery of Sirmium has been considered as being an *extra muros* fortification structure that was in a functional relationship with the city's eastern gate.⁷¹ However, the precise chronology of the structure has not been established.

The second hypothesis argued by M. Mirković, emphasises the fact that there is neither direct epigraphical nor archaeological evidence about any military camp in existence within the city of Sirmium itself, and proposes that the city developed into a Roman colony, probably in the time of Domitian as a consequence of the presence of settled Roman citizens and merchants (*Colonia Flavia Sirminiensium*, gained the status by 96 CE).⁷²

Nevertheless, Mirković considered that at least during the “Batonian War” a garrison could have been stationed there; in addition, Roman troops would have been in the area with later emperors who stayed or were passing through Sirmium, such as Marcus Aurelius, Septimus Severus, Gallienus, etc.; but as Mirković stressed, there was no a permanent military camp within the city boundaries or its immediate proximity, with different legions or their detachments being only temporarily camped there.⁷³

Based on *Notitia Dignitatum*, Mirković concluded that Sirmium housed smaller military troop prefects, a cavalry unit (*Ala Sirmiensis*) and a fleet stationed there during the Late Empire.⁷⁴

The suggestion of Sirmium being a civilian centre from its beginning was also accepted by Eadie,⁷⁵ Ferjančić,⁷⁶ and recently by Crnobrnja, who also concluded that even if there were troops in the city, the army did not stay permanently in Sirmium.⁷⁷

In accordance of this view, the existence of a temporary Roman military camp or camps near the city was suggested by several authors.⁷⁸

Mirković was the first who hypothesized that a temporary military camp could have been located at a distance of three to five miles east of Sirmium, in the field of Crepovac.⁷⁹ The hypothesis of Mirković was founded on the following.

(1) A general conclusion that when Roman emperors stayed in Sirmium the army accompanied them, with Domitian being the first emperor to use Sirmium as his base.⁸⁰

(2) The notion of the old Roman tradition that troops needed to be outside a city, since their presence within the city walls would endanger the citizens, with Sirmium being no exception to other cities, where temporary camps are concerned.⁸¹ Analogies were made to similar cases of larger cities, such as Rome, where the army camped outside the city's *pomerium* within a state domain in the Field of Mars (*Campus Martius*) before the time of Augustus.⁸² Other such cities included Naissus in Moesia Superior, where Valentinian and Valens camped with the army at Mediana, three Roman miles from the city; Nicomedia, where a military camp was also three miles away; Constantinople, where the army camped in Hebdomon, seven miles from the city's *Milion*, etc.⁸³ The analogy with Rome

⁶⁷ Vujović 2021.

⁶⁸ Vell. Pat. II. 110. 6; Dio LV. 29.1–4; Dio LV. 32.4; Dio LV.33.1. Jeremić 2016, Fig. 50; Vujović 2021, 152–154.

⁶⁹ Jeremić 2016, 127–132, Fig. 29, 79, 80; Milošević 2001, 61, 62; Mirković 2017, 70, 160.

⁷⁰ Vujović 2021, 152–154.

⁷¹ Milošević 1994, 17, 18; Milošević 2001, 63; Popović 1963, 63, 64; Popović 1978, 2; Vasilčić 1952, 168. Excavations done in 1950, 1961, and 1962, with 120 m sq. being researched.

⁷² Mirković 2017 [1971], 28, 29.

⁷³ Mirković, 1990, 639, 641 (note 42); Mirković 2017 [1971], 21, 63, 71.

⁷⁴ Mirković 2017, 71.

⁷⁵ Eadie 1977, 210.

⁷⁶ Ferjančić 2002, 53.

⁷⁷ Crnobrnja 2020, 178.

⁷⁸ Alföldi 1939, 214; Birley 2001, 163; Dimitrijević, Prica 2023, 229–232; Luttwak 2016, 212; Mirković 2017 [1971; 2008], 66, 67, 71, 72.

⁷⁹ Mirković 2017 [1971; 2008], 71, 72.

⁸⁰ Mirković 2017, 70; Mommsen 1996 [1909], 206.

⁸¹ Mirković 2017, 71.

⁸² Beckmann 2011, 38–51, Fig. 2.1; Carandini, Carafa (eds) 2017a, 493–521; Carandini, Carafa (eds) 2017b, Tab. II, Tab. 207, Tab. 232, Tab. 275; Chevallier 1976, 68, 69, Fig. 9; Platner, Ashby 1929; Preest 1995, 126.

⁸³ Mirković 2017, 71, 72.

and *Campus Martius* may be further supported given that next to Sirmium was the territory of the larger community of *Pagus Martis*, which included several settlements (*vici*), suggested by epigraphical evidence from Aquileia and Rome, which suggest that citizens of Sirmium in the 3rd century served in the auxiliary units of Legio I Adiutrix and Legio II Adiutrix.⁸⁴

(3) The passage in *Res Gestae*, by Ammianus Marcellinus, which refers to a victory of the emperor Constantius II over the Quadi and the Sarmatians in 358, where the author noted there was a military camp with tents (*tentoria, sedes*) in the proximity of Sirmium; the same passage recorded that the emperor delivered his speech to the army in the camp, after which he went to a palace (*‘ad regiam’*) for two days before he entered the city of Sirmium.⁸⁵

Mirković identified the palace as one that the emperor Maximian Herculus built in the early 4th century near the city;⁸⁶ this was also mentioned almost a century after it was built, in the *Epitome de Caesaribus*;⁸⁷ and was discovered at the archaeological site of Glac, southeast of Sremska Mitrovica and south of the field of Crepovac.⁸⁸

(4) The finds of three milestones with imperial dedications, set three and five miles east of the city along the *via militaris*.⁸⁹ The latest milestone was dedicated to Constantius II and has been dated to 354–355, with a recorded distance of five miles from (to) Sirmium.⁹⁰ The other two milestones from the field of Crepovac were found together and both note three Roman miles from (to) Sirmium.⁹¹ The later of these two was dated to 198, dedicated to Septimius Severus and Caracalla; the older has been dated to 161, dedicated to Marcus Aurelius and Lucius Verus.⁹² According to Mirković, these milestones indicate a place three or five miles from the city where the emperor’s state domain was, where the troops were temporarily camped.⁹³

This area could have included a farm or a villa within a state domain where the army camped for limited periods of time, with the military camp location either changing or the points of measurements from Sirmium being changed.⁹⁴

The hypothesis of Mirković was further considered in the context of the deathplace of the emperor Marcus Aurelius; with both literary sources about the event and the archaeological topography of Sirmium’s surrounding having been considered, the eastern periphery of the city with the *via militaris* remains points to where the temporary military camp could have been set up at that time.⁹⁵ One of the sources indicating the

existence of a camp is Herodian’s description of events after Marcus Aurelius died in 180 CE, with Commodus gathering the troops in a military camp (*stratopedon*) located in a military assembly field (*pedion*);⁹⁶ the deathplace of the emperor, therefore, was established as being Sirmium.⁹⁷

The only two locations east of Sirmium in the city’s immediate proximity and considered to have included fortifications were the sites of Glac and Klisina. The Glac site was erroneously considered to be the “Castra of Khagan Bayan” by Ignjat Jung.⁹⁸ The site of Klisina (also known as “Vienac”) has been considered as a Late Iron Age, Roman and medieval site with remains of a Roman fort situated next to an ancient road.⁹⁹ I. Jung noted that prior to 1889, a lot of stone was taken from Klisina by the inhabitants of Šašinci.¹⁰⁰

Thus, the modern archaeological literature suggests a low likelihood of significant troop placements within the boundaries of the city of Sirmium. The work of Mirković strongly favoured the existence of a temporary military camp, likely to have been located at three to five miles east of Sirmium, in the field of Crepovac. However, no archaeological investigations have identified the precise location of these camps.

⁸⁴ Dušanić 1995, 41; Kovács 2013, 136; Mirković 2017, 50, 62 [*CIL* VI 37212 (Dessau *ILS* 2034); *CIL* V 892].

⁸⁵ Ammianus Marcellinus, *Res Gestae* XVII.13.27–29, XVII.13.33; Rolfe 1935, 396–401.

⁸⁶ Mirković 2017, 39, 72.

⁸⁷ Banchich 2018; *Epitome de Caesaribus*, XL.10.

⁸⁸ <https://glac-project.sydney.edu.au/> (Accessed on 6 Sep 2024).

⁸⁹ Dimitrijević, Whitehouse 2021; Mirković 2017, 232–234.

⁹⁰ *CIL* III 10617–3705; *ILS* 732; Chevallier 1976, 42; Mirković 2017, 232, 233.

⁹¹ *CIL* III 10615; *CIL* III 10616; Mirković 2017, 232, 234.

⁹² Dimitrijević, Whitehouse 2021; Lassère 2011, 1010, 1011; Mirković 2017, 232, 234.

⁹³ Mirković 2017, 72.

⁹⁴ Mirković 2017, 72.

⁹⁵ Dimitrijević, Prica 2023, 229–232.

⁹⁶ Dimitrijević, Prica 2023, 229–232; Herodian, I.5.1–2; Echols 1961.

⁹⁷ Dimitrijević, Prica 2023.

⁹⁸ Miladinović-Radmilović, Radmilović 2015, 47, 58 (letters of I. Jung no. 233 from 12 Dec 1903 and no. 256 from winter 1904).

⁹⁹ Crnobrnja 2020, 189; Jung 1890, 26, 27; Popović 1967a, 4; Popović 1967b, 179.

¹⁰⁰ Jung 1890, 26.

Remote Sensing Evidence

The Glac Survey team utilised a range of remote sensing resources to examine the area around Klisina. These included LiDAR images, low level colour aerial photography, and an examination of imagery on Google Earth.

The LiDAR images identified no linear features near Klisina. The area has been the subject of regular deep ploughing and cultivation and, as a result, most elevation changes in the fields have been obliterated. The low-level colour aerial photography reflected conditions at the date of filming and identified no linear features near Klisina. The limitations of one-off photography do not enable changes in various seasonal or soil moisture conditions to be discerned. However, the Google Earth time lapse features enable the same area to be examined under different seasonal and, particularly, different soil moisture conditions. The time lapse Google Earth images were examined for the periods of July 2017, February 2019, August 2020, and July 2022. These images identified a series of 19 linear features. One of these raw images, from July 2022, is depicted in Figure 5, with its filtered versions de-

picted in Figure 6, and the interpreted linear features depicted in Figure 7, each marked for identification with either an upper-case or a lower-case letter.

Of these 19 linear features, 13 include at least one right-angled corner, and of these 13, 6 include two right-angled corners, and none with 3 right-angle corners. Of the 19 linear features, 6 are straight lines only with no corner identified. The identified linear features are depicted in Figure 7, each marked with a lower-case letter.

Such straight-line features would have an anthropogenic origin, as no natural process could account for such a pattern. No feasible modern origin could be ascribed, although it should be noted that the area has been bisected by a modern gas pipeline, the location of which is indicated in Figure 7.

The pattern of features closely resembles patterns for temporary Roman military camps identified in many areas, particularly at Brigetio on the Danube in Hungary, in Slovakia, in Romania, and in Britain. Hence, there is a strong *prima facie* case for the indication of the presence of multiple temporary Roman military camps near Klisina. There appears to be a

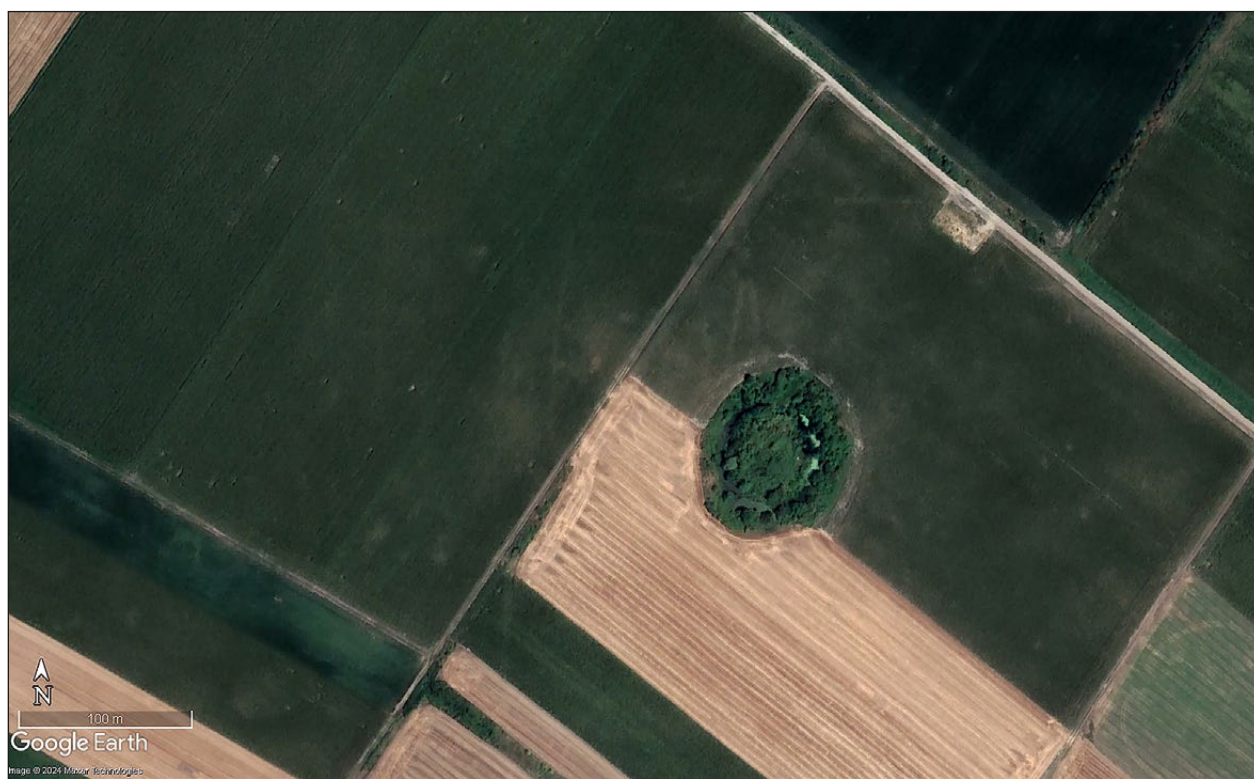


Fig. 5. The linear features (cropmarks) around Klisina visible in the satellite image from July 2022

Сл. 5. Линејски трајкови (фитиолошки трајкови) око Клисине видљиви на сателитском снимку из јула 2022.

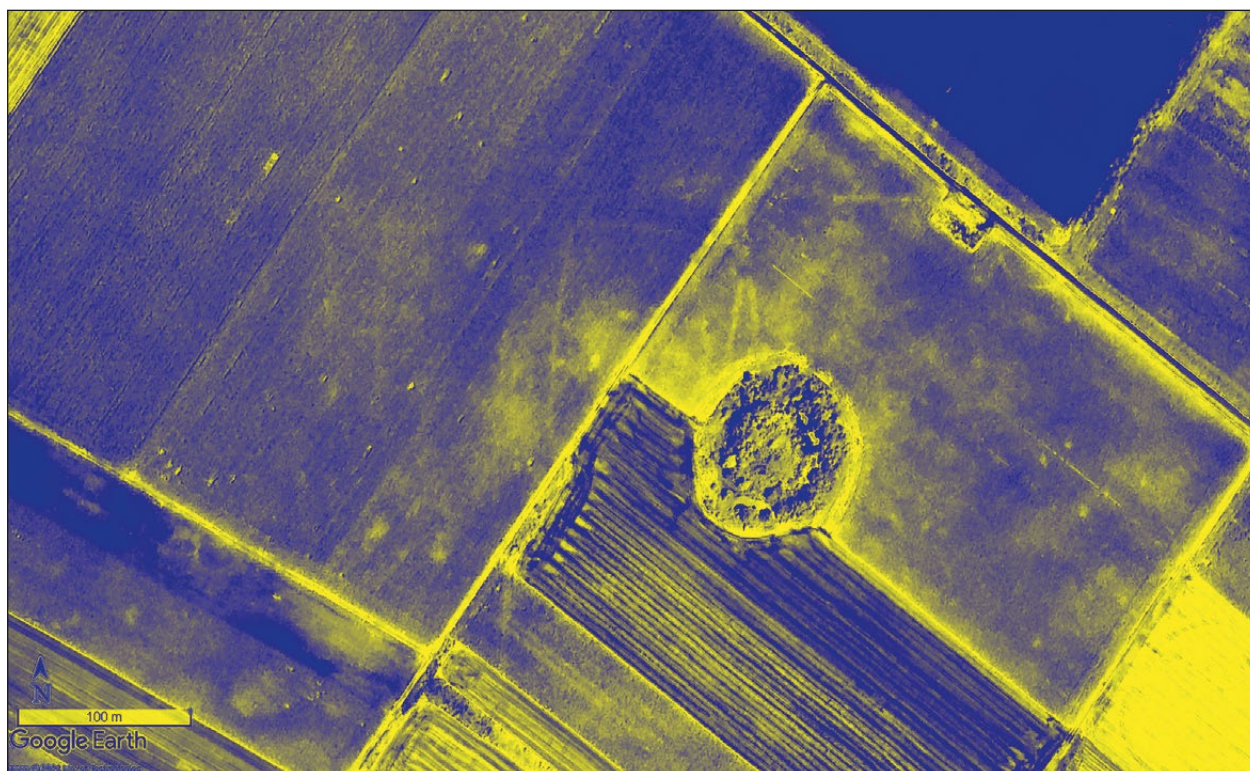


Fig. 6. Filtered version of the linear features (cropmarks) around Klisina

Fig. 7. The interpreted linear features around Klisina

Сл. 6. Пречишћен приказ линијских трајаова (фијолошких трајаова) око Клисине

Сл. 7. Прејознајни линијски трајаови око Клисине

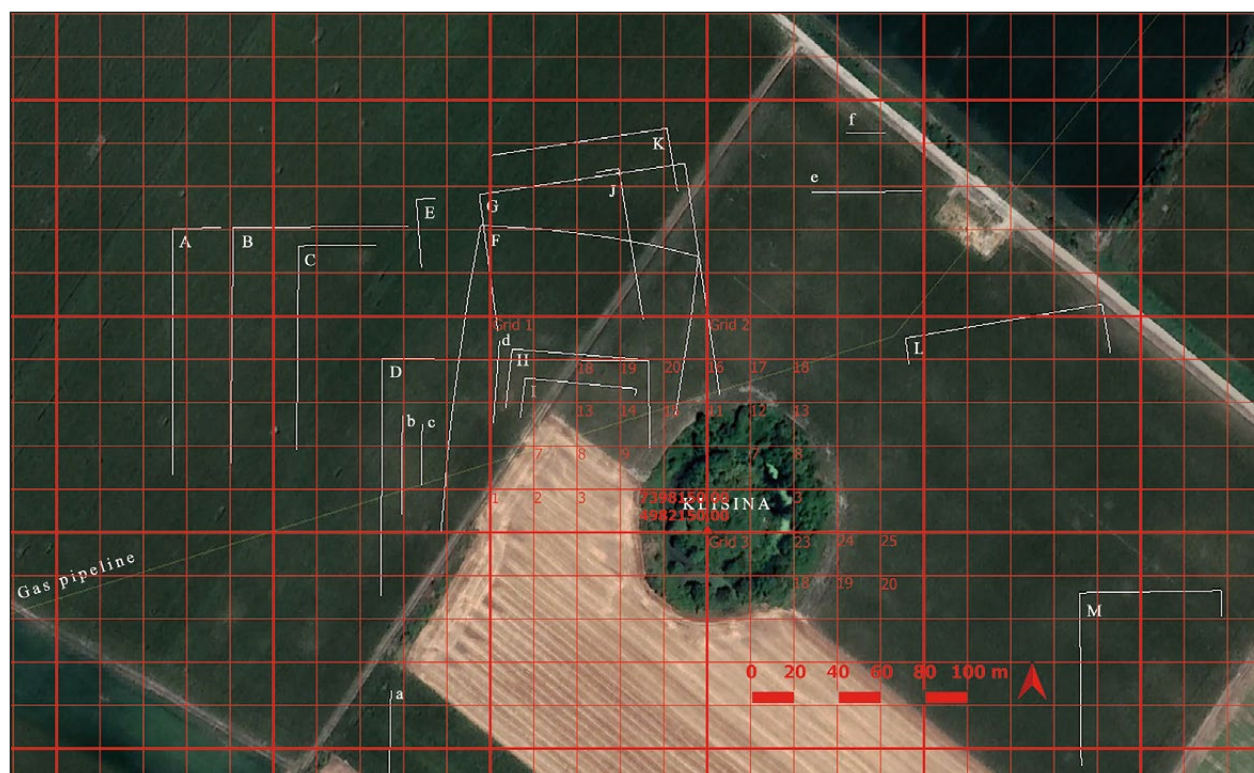


Fig. 8. Grids and squares surveyed at Klisina in 2023 and 2024, superimposed over interpreted linear features (cropmarks and soil marks)

Сл. 8. Квадратне мреже и појединачни квадрати (јединична поља) истражени 2023. и 2024., суперимонирани у односу на препознатљиве линијске трагове (фитиолошки и трагови на површини земље)

minimum of 11 identifiable temporary Roman military camps, based on the linear features with one or more right-angled corners. There are an additional 2 features with one or more right-angled corners that could either be additional separate temporary Roman military camps, bringing the total to 13 camps, or internal features within a temporary Roman military camp as they are proportionate and parallel to a larger enclosure.

Surface Field Archaeological Evidence

In the Klisina area, field work included extensive field walking and intensive field survey involving the collection, counting, and weighing of all surface material (ceramics including pottery, bricks and tile, stone, and metal) in 27 squares, each measuring 20 x 20 m, in 3 grids (Fig. 8). A grid comprises 5 x 5 squares, a total of 25 squares per grid, but the number of squares examined can be reduced due to paucity of cultural material, ground coverage of planted wheat, which significantly reduces surface visibility, or other sur-

face conditions, such as vegetated areas, which in the case of the Klisina area is the moated area, its inner mound and outer encircling mound, which are either heavily vegetated or water. The grids are defined in the Glac Survey GIS.

The entire area around Klisina was initially subject to a preliminary field reconnaissance to collect items of interest. The preliminary field reconnaissance identified the following points of interest:

- In the outer ring mound surrounding the moat, two entry gate features were noted, each with monumental stone pavements and supports. These entrances are oriented to the north and south-east. As there is no natural stone in the area, these were clearly imported.

- The inner mound was very heavily vegetated and, apart from a modern hunting lodge in the ruins, no cultural features could be identified.

- In the ploughed fields in the proximity of the moated area, surface finds were located of finely worked slabs of green Peloponnesian marble (*Lapis Lacedaemonius*), white marble, part of a white marble

slab with inscribed letters, and an array of Roman brick and tile fragments and pottery.

– In the areas covered by the suggested camps, surface finds were consisted of Roman brick and tile fragments, Roman pottery, and stone.

In view of the results of the preliminary reconnaissance, intensive grid surveys were undertaken in the ploughed fields surrounding the moated area. Figure 8 indicates the location of the grids or partial grids that were subject to intensive field survey. Some grids were truncated due to the presence of a newly planted wheat crop to the west and north-west of the moated area, both in 2023 and 2024.

The limited amounts of Iron Age and earlier pottery do not indicate intensive Iron Age use of the area, just as the limited amounts of medieval pottery do not indicate intensive medieval use of the area. The density of Roman brick and tile fragments and pottery indicate the area was heavily used in the Roman period. This usage can be separated into two areas, the moated area precinct and immediate surroundings, and the area of potential temporary Roman military camps. As previously mentioned, the moated area is subject to ongoing investigations by the Glac Survey but, on the basis of the finds thus far, the presence of a fort or watch tower (*burgus* or *castellum*) is less likely than a memorial structure or sepulchre. However, these preliminary observations require further investigation by the Glac Survey. In the area of the potential temporary Roman military camps, the remote sensing shapes conform with the pattern and layout of such camps, and this conclusion is verified by the surface finds of Roman cultural material.

Accommodation for the Roman Army

A preliminary matter to consider is the accommodation arrangements for Roman military forces. When undertaking duties away from their normal or prior residence, these forces could have been accommodated by way of billeting arrangements in private dwellings in their area of operation. Alternatively, they could have been housed in purpose-built accommodation. Such purpose-built accommodation could have been in barracks located in urban areas, permanent or long-term barracks outside of urban areas in locations requiring their presence, or in barracks outside of urban areas for short term use, with some short term uses as limited as just a single night. There is no clear-cut distinction between the types of barracks accommodation outside of urban areas. Rather, there is a continuum

based on three axes: the duration of stay, the purpose or function of the military presence, and the nature and extent of development and structures erected, as evidenced by archaeological remains.

The first and third axes may have had a general correlation but this may not necessarily have always been the case, as other factors such as availability of raw materials and the climatic conditions may have impinged on choices. The first two axes cannot be discerned from archaeological evidence with any certainty, except perhaps in a few cases, such as camps forming part of a siege, such as at Alesia in France and Masada in Israel, where the besieged and besiegers can be identified archaeologically. The gradations along this continuum and its three axes have obstructed attempts to develop a clear-cut classification of field accommodation arrangements for the Roman military, such as distinctions between a camp, a fort, and a fortress.¹⁰¹ This is further complicated by the possibility that, over the course of time, what may have been one type of camp may have evolved into another, such as a temporary winter camp becoming a permanent fort, or what was intended to be a permanent facility was subsequently abandoned.¹⁰²

The nature of Roman camps has been taken by some as a general ideological indicator of Roman society and its organisation, persistence, and thoroughness. Hence, McWhorter wrote: “*In the camps of the legions are shown in a greater degree than in any other phase those qualities that ensured the success of Roman arms.*”¹⁰³ Teal sees the Roman camp as a modulator, providing a sense of order and predictability, which is characteristically Roman throughout a vast empire, while retaining a level of flexibility and adaptability to respond to changing conditions.¹⁰⁴ While attributing a general society-wide ideological basis to Roman military camps may be reading too much into camps, they had an internal ideological role within the army and exhibit some of the characteristics underlying Roman military success and the internal psychological conditioning of soldiers. Hence, the camps were a symbol of the discipline and organisation of the Roman army.¹⁰⁵

¹⁰¹ Webster 1988, 167.

¹⁰² Breeze 2002, 17.

¹⁰³ McWhorter 1942, 442.

¹⁰⁴ Teal 2019, 239.

¹⁰⁵ Gilliver 2001, 63; Adcock 1940, 13–14.

Origins of the Roman “Marching Camp”

Ancient authors speculated on the origin of the practice of the Roman army to construct camps while on campaigns. Xenophon noted the Greek approach to military camp construction.¹⁰⁶ Livy and Frontinus both attributed the idea of constructing camps to emulating Pyrrhus of Epirus, when one of his camps at Malventum was over-run in 275 BCE and the plan was examined and copied. Livy noted the camp had both Greek and Etruscan influences.¹⁰⁷ The Roman camps impressed Polybius.¹⁰⁸ However Plutarch describes Pyrrhus’ surprise at the practice and layout of the Roman camp.¹⁰⁹ Gilliver favours the idea that Pyrrhus was the inspiration for Roman military camp construction.¹¹⁰ Certainly, by the time of the Second Punic War, the Roman army regularly built field camps.¹¹¹

The similarity between the planning and design of Roman military camps and Roman urban settlements has been noted. Some have suggested that the design of Roman military camps was a by-product of the skills developed in the founding of towns and the layout of land subdivision.¹¹² In this context, the strong connection between the Roman army and civil surveyors is noted.¹¹³ The grid system of urban planning is traditionally attributed to the Greek, Hippodamus of Miletus and its origins do not appear to be military based.¹¹⁴

Like many aspects of Roman achievement, the practice and design of military camps absorbed ideas and influences from Greek, Etruscan, and earlier military practices as well as civilian urban planning and refashioned and moulded them into something new and distinctively Roman.

Military Forces in Urban Areas

Troops could be housed in urban areas in or near their areas of operations. This could be achieved by billeting arrangements in private dwellings or, alternatively, in purpose-built barracks. These options were not uncommon, but faced some obstacles. The housing of troops in urban areas raised the concern of the corrosive effects of the urban life and its comforts on military discipline and combat readiness. This played into the Roman cultural myth of the virtues of a hard life on rural farms, eschewing luxury and pleasure.

The long held religious convention prohibiting armed forces from crossing the *pomerium* into an urban area derived from the foundational myth of Rome of Romulus ploughing a furrow to mark the boundary of the city, with the boundary between a city and its

hinterland imbued with religious and political significance.¹¹⁵ The issue revolved around whether *imperium*, the right of military command, existed within the *pomerium*. In normal circumstances, *imperium* did not exist within the *pomerium*, but an exception was made during a triumphal parade when a military commander was allowed to lead soldiers across the *pomerium* and into the city.¹¹⁶ There is, perhaps, a distinction between a commander’s loss of *imperium* in entering the city and the entry of soldiers into the city. However, a dictator could exercise *imperium* within the *pomerium*.¹¹⁷ There are many instances of consuls using *imperium* within the *pomerium* to conduct military operations.¹¹⁸

The *pomerium* served as a spiritual threshold in Roman thought, with an important role in the governance and religious rituals of a city. Dionysius of Halicarnassus says that towns across Rome’s provinces were also imbued with such sacred boundaries at their foundation.¹¹⁹ Although there is no archaeological or literary evidence, it is reasonable to assume that Roman Sirmium had a *pomerium* also.

However, Koortbojian disputes that the prohibition of armed troop crossing the *pomerium* ever actually existed.¹²⁰ Thus, the traditions relating to the *pomerium* would not constitute a reason why troops could not have been housed within the boundary of Sirmium.

¹⁰⁶ Álvarez Rico 2002.

¹⁰⁷ Frontinus, *Strat.* 4.1.14; Livy *Histories*, 35.14; Le Bohec 1994, 131; Gilliver 2001, 66.

¹⁰⁸ Polybius, *Histories* VI, 26, 42; XVIII 18.

¹⁰⁹ Plutarch, *Pyrrhus* 16, 4–5.

¹¹⁰ Gilliver 1993, 62.

¹¹¹ Gilliver 2001, 69.

¹¹² Salvatore 1996, 145.

¹¹³ Salvatore 1996, 145.

¹¹⁴ Whitehouse, Harize, 2020, 365; D’Agostino 2006; Delouis *et al.* 2007; Gosden 2004.

¹¹⁵ Plutarch, *Romulus* II.1–3; Koortbojian 2020, 11; Aulus Gellius, *Attic Nights* 15.27.5; Rolfe 1927; Holland 2023, 159–160.

¹¹⁶ Drogula 2007, 441–442.

¹¹⁷ Drogula 2007, 445, 447–448.

¹¹⁸ E.g., the crushing of Gaius Gracchus in 121 BCE, Marius’ campaign to defeat Saturninus and Glaucia in 100 BCE, Cicero executing some of the Cataline conspirators in 63 BCE and Pompey packing Rome with troops during the trial of Milo in 52 BCE, all instances of consuls exercising the final decree of the Senate.

¹¹⁹ Dionysius of Halicarnassus, *Roman Antiquities*, 1.88; Lee 2014, 1–2.

¹²⁰ Koortbojian 2020, 12–13; see also Johnson 1983, 11–12.

The perceived impact of urban life on soldiers is well expressed in Livy's account of Hannibal at Capua during the Second Punic War.¹²¹ Vegetius states that it was well known that cities corrupted soldiers.¹²² However, the temporary housing of troops in urban areas was a long-standing practice, but increased during the Dominate.¹²³ Zosimus blamed Constantine for the destruction of the security of the frontiers, by moving troops to cities.¹²⁴ Ammianus Marcellinus considered the housing of troops in urban areas to be for economic reasons, as it was easier to supply the army if it was near centres of production and exchange.¹²⁵ The billeting of troops in urban areas was very unpopular with the civilian population, according to Zosimus.¹²⁶ The extensive provisions in the Theodosian Code on the compulsory quartering of troops in civilian houses in urban areas reflects the problems created by such billeting arrangements.¹²⁷

Tacitus wrote that when Nero sent Gnaeus Domitius Corbulo as legate to Cappadocia in 54 CE he found the legions in Syria were lazy and unused to military rigours.¹²⁸ Herodian reports a speech given by Septimus Severus to his troops in the Danubian legions at Carnuntum in the civil war in 193–194 CE in which he decries the Syrian legions for their taste for luxury.¹²⁹

Thus, we have the double combination worthy of Roman disgust, troops stationed in an urban area and those urban areas being in Syria, an alleged centre of depravity. These twin themes were in effect a literary topos, where prejudice outweighed reality.¹³⁰ Wheeler, in reviewing the issue of the laxity of Syrian legions, noted that the practice of basing legions in Syria in cities was logical as cities were major strategic locations and communication hubs, but there was no evidence of permanent legions based in Antioch or Daphne, the so-called "party towns".¹³¹

The stationing of troops in an urban area was generally undesirable, not because it transformed the soldiers into party boys unsuitable for combat, but due to its effects on relations with the civilian population, the adverse effects on discipline, and the increased risks of corruption. Hence, it was preferable to be avoided, except where strategic factors required force positioning in cities.¹³²

In the case of Sirmium, as indicated earlier, there have been some suggestions that soldiers were stationed in the city, but there is an absence of clear evidence. Radman-Livaja doubts whether there were military camps at Sirmium prior to the revolt of Bato, but during the uprising troops were present in Sirmium to

stave off attacks of the Daesidiates and Breuci, and following the change in strategy by Tiberius to one of holding the towns and conducting a scorched earth policy in the countryside, troops are likely to have been in Sirmium.¹³³ Radman-Livaja suggests that during the rule of Tiberius, Legio IX Hispania or XV Apollinaris may have been stationed at Sirmium, although garrison locations are very unclear.¹³⁴ However, how many and where they were housed is unknown. Following the crushing of the revolt and the reign of Tiberius, the army was transferred from the hinterland to the Danube frontier.¹³⁵ Thereafter, it appears that soldiers only occasionally stayed in the city in the late 2nd century and 3rd century CE. As a provincial capital and host of an imperial palace, some soldiers would have been present in the city. Sirmium was the location of numerous *beneficiarii consularis*, staff officers seconded from their units to assist the provincial governor, as evidenced by their many altars discovered in the city.¹³⁶ Troops would also be present procuring goods and services in the city for their units, as is seen in Hunt's Pridianum, showing the absentees from Cohors I Hispanorum Veteranum in Moesia Inferior in c. 105 CE.¹³⁷ MacMullen claims that there were certainly troops in Sirmium when Gallienus used the city as his capital, that Tetrarchic barracks have been recognised in excavations and that Ammianus Marcellinus records their presence in 361 CE with an archer cohort

¹²¹ Livy, History 23.18. 10–16.

¹²² Vegetius, Epitome of Military Science 1.3.

¹²³ Southern and Dixon 1996, 83; MacMullen 1988, Appendix C.

¹²⁴ Zosimus, New History 2.34.2.

¹²⁵ Ammianus Marcellinus, History 16.4.1; MacMillan 1988, 176.

¹²⁶ Zosimus, New History 2.34.2, 4.16.5; Southern, Dixon 1991, 85.

¹²⁷ Theodosian Code, Chapter 7.

¹²⁸ Tacitus, Annals 13.35.

¹²⁹ Herodian History 2. X. 6–7; Echols 1961, 66; see also Zosimus, New History 1.33.2 and Southern, Dixon 1991, 171–172 on the Scythian attack on Trapezus.

¹³⁰ Isaac 1990, 270.

¹³¹ Wheeler 1996, 234, 271.

¹³² Isaac 1990, 309.

¹³³ Radman-Livaja 2012, 164–166.

¹³⁴ Radman-Livaja 2012, 169–170.

¹³⁵ Radman-Livaja 2012, 168.

¹³⁶ Mirković 1970; Campbell 1979; Popović 1989.

¹³⁷ Whately 2021, 131–133; Fink 1971. No 63.

and two legions.¹³⁸ However, in a comprehensive review of the Roman army at Sirmium, Mirković concluded that there is no convincing evidence to suggest that the city was a permanent legionary camp.¹³⁹ The barracks noted by MacMullen are likely the outpost of the *beneficiarii consularis* near the western rampart of Sirmium, discovered during the construction of a new wing of the hospital in 1988.¹⁴⁰ Hence, Sirmium had no permanent garrison. The issue of whether in times of war Sirmium was a gathering point for troops about to go on campaigns is also of interest. If this was the case, in the process of troop assembly for a campaign, those troops do not appear to have been housed temporarily in the city, either billeted with the civilian population or in barracks in the city, as the textual evidence points to a camp located well outside of the city and the archaeological evidence within the city does not confirm any major camp or barracks in which the gathering forces could have been housed in the city.

Evidence of Roman Camps

The evidence of Roman short-term camps is often fleeting. Jones notes that more than half of the camps recorded in the Roman Empire are known only from crop marks revealed from the air.¹⁴¹ The visibility of the enclosing perimeter rampart or ditch and possibly gate defences may be the only features enabling identification in both aerial or ground surveys.¹⁴²

Mirković noted: “From time to time, larger military units were concentrated in Sirmium or in the city surroundings. However, even in war time, the troops could not be stationed there during the winter season but were garrisoned in nearby forts”.¹⁴³

Military Manuals and Other Textual Sources on Camps

A number of ancient literary sources inform us about Roman military camps. These sources are excerpts of Roman military manuals or are derived from Roman military manuals. In addition, there are ancient literary sources, primarily histories, that cast further light on Roman military camps.

Polybius, in his *The Histories*, after dealing with the Battle of Cannae in 216 BCE in the Second Punic War and the activities of Phillip V of Macedon, interrupts his narrative to provide a digression with an overview discussion of the Roman constitution and Roman military organisation, including Roman military camps. Polybius lived from c. 200 to 118 BCE and his *The Histories* covers the period from 264 BCE to

146 BCE, but mainly focuses on the years 221 BCE to 146 BCE, and seems to have been written in c 150 BCE. Polybius was Greek, and was held hostage in Rome after 168 BCE, where he befriended Scipio Aemilianus and accompanied Scipio to Spain and Africa and was present at the siege and sacking of Carthage in 146 BCE. Thus, Polybius wrote about 66 years after the Battle of Cannae.

Polybius notes the standardisation of the plan of camps, writing: “one simple plan of camp being adopted at all times and in all places”¹⁴⁴ Polybius contrasted the Roman camp design with that used by the Greeks.¹⁴⁵

Polybius outlines the process of camp establishment by an initial survey, then the marking out with flags of the key components, including the general’s tent (*praetorium*), the headquarters (*principia*), the tents of the legionaries, the tents of the tribunes, the street pattern, the cavalry quarters, and the auxiliaries’ quarters.¹⁴⁶

Polybius refers to the “agger” or rampart on numerous occasions but with no explanation of its construction. He refers to the clear area between the camp components and the rampart or *agger*, as the *intervalum*. Polybius’ account provides a detailed and complicated outline of the positioning and distances of the internal elements on a camp. These are best outlined diagrammatically, a task carefully undertaken by the German *limes* scholar, Ernst Fabricius, in 1932 and reproduced below.¹⁴⁷

Fabricius’ reconstruction of Polybius’ camp in diagrammatic form has been generally accepted as accurate.¹⁴⁸

However, there are some important issues about Polybius’ description of the Roman camp. These relate to the following:

- What type of camp is Polybius describing?
- What is the date of the type of camp he describes?
- What is the source of information for his description?

¹³⁸ MacMullen 1988, 217.

¹³⁹ Mirković 2017, 63.

¹⁴⁰ Mirković 2017, 72.

¹⁴¹ Jones 2017, 525.

¹⁴² Jones 2017, 525.

¹⁴³ Mirković 2017, 70.

¹⁴⁴ Polybius, *The Histories*, 6.26.10; Paton 1926, 329.

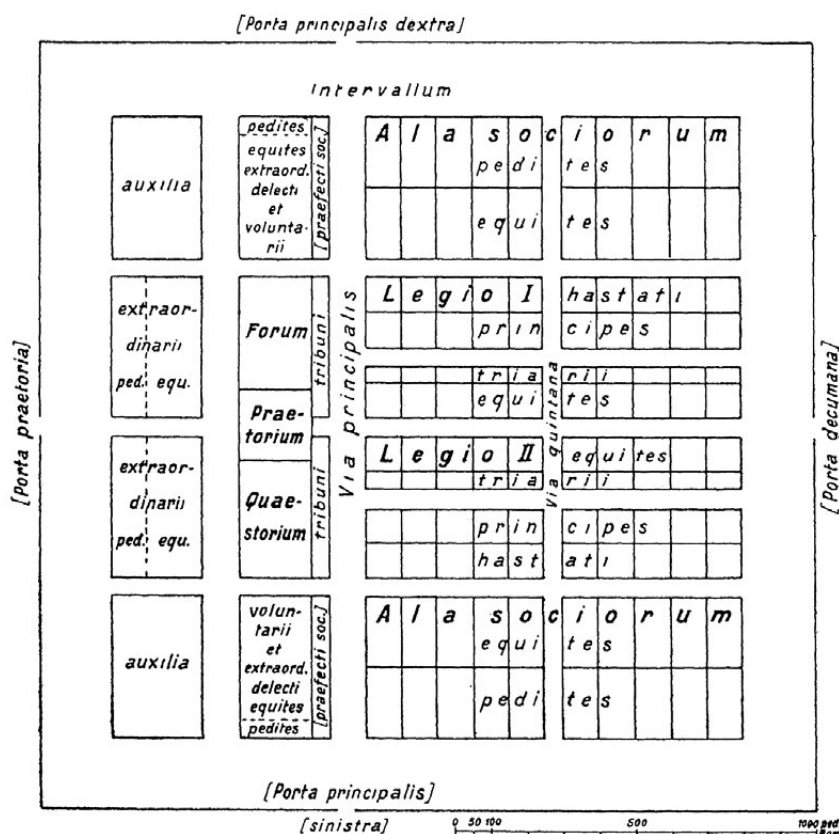
¹⁴⁵ Polybius, *The Histories*, 6.42.1–5; Paton 1926, 367.

¹⁴⁶ Polybius, *Histories*, 6.31.10–14; Paton 1926, 339–341.

¹⁴⁷ Fabricius 1932, 79.

¹⁴⁸ Jones 2012, 37.

Сл. 9. Фабрицијев план
Полибијевој војној лојора



- Has the Polybian camp been validated archaeologically?

The issue of the type of camp being described by Polybius is raised when he states that his description relates to only half of an army of two consuls comprising four legions, and that you need to place a mirror image of Fabricius' plan next to his diagram to give you the plan for a 4 legion, 2 consular army.¹⁴⁹

It has been suggested that Polybius used anachronistic and dated information on his description of a camp.¹⁵⁰ It has also been suggested that Polybius' description of the camp was derived from an outdated military textbook.¹⁵¹

Not merely was Polybius describing a very specific type of camp, namely a mobilisation camp for a 4 legion, 2 consular army, but in the half century after the Battle of Cannae up to when Polybius was writing his *Histories*, there were a number of significant changes to the Roman army that impacted upon camp layout and design. The first of these changes was at the end of the 2nd century BCE with the adoption of the cohort as the main tactical unit within a legion, with ten cohorts per legion, rather than a structure based on maniples.¹⁵² Originally, there were 30 mani-

ples in each legion, and this became 10 cohorts, with a cohort usually consisting of 300 men and then increasing to 480 men. Thus, a legion of 10 cohorts of 480 men would total 4,800 men.¹⁵³ This structure remained the nominal legionary size during the empire. This change impacted on the layout of tents in a camp. The second change was the passage of the *Lex Iulia* in 90 BCE, extending Roman citizenship after the Social Wars, with allied troops no longer in separate *alae*, but now part of the legion, removing the need for separate accommodation arrangements within a camp for allies.¹⁵⁴ The third change was to cease to use after the Second Punic War, as the norm, a double consular manipular army of 4 legions with accompanying allies.¹⁵⁵

¹⁴⁹ Fabricius 1932, 79; Salvatore 1996, 2, 9; Keppie 1984, 37–38.

¹⁵⁰ Salvatore, 1996, 2.

¹⁵¹ Gilliver 2001, 69; Salvatore 1996, 18.

¹⁵² Salvatore 1996, 139; Dobson 2008, 58–64.

¹⁵³ Dobson 2008, 62–64.

¹⁵⁴ Salvatore 1996, 138.

155 Dobson 2008, 56.

Later still, in the mid-1st century CE, legions were based on the Rhine and elsewhere, rather than mobilised from Italy.¹⁵⁶

Dobson has suggested that, instead of using an outdated source, what Polybius was doing was describing the army and its camp as at the date when the digression occurred, namely at the time of the Battle of Cannae and not at the time of writing.¹⁵⁷ Thus, Polybius only included material relevant to the period to which his digression relates. This appears to be a reasonable explanation, but the absence of an explanation by Polybius of the date of his description of the army and its camp is unhelpful.

Dobson notes the emphasis in Polybius' account to tribunes and suggests that his source may have been a manual for military tribunes.¹⁵⁸ Dobson also questions the measurement system used by Polybius; he considers Polybius is using Hellenistic feet rather than Roman feet, with a Roman foot equivalent to 0.296 metres, while a Hellenistic foot is equivalent to 0.355 metres, with 200 Hellenistic feet equating to 240 Roman feet.¹⁵⁹

The issue whether the Polybian camp model has been archaeologically validated is reliant upon the range of Republican camps in the vicinity of Numantia in Spain. Numantia was a Celto-Iberian stronghold ultimately besieged and destroyed by Scipio in 133 BCE in the culmination of the long running Numantian Wars in Spain, stretching from 153 BCE to 133 BCE.¹⁶⁰ These were excavated by Adolf Schulten, between 1905 and 1927. Part of the problem with using the numerous camps near Numantia is that many of them were for a siege of a stronghold rather than marching camps, and most of the camps had walls and internal structures built with stone, raising the issue of their comparability to tented marching camps, given the difference of both function and construction materials.¹⁶¹ Fabricius noted that east of Numantia in Spain, remains of a Roman camp were found by Adolf Schulten in the early 1900s, corresponding to the description of Polybius; Jones notes that the Roman camps at Numantia date from the same time as the writing of Polybius' work. A full examination of the Numantian camps and their consistency with the Polybian model is not required for the examination of the imperial era camps at Klisina.

The military camp described by Polybius long precedes the date of camps at Klisina, which all relate to the High Empire or Late Antiquity, but the Polybian model is both a starting point to understand the struc-

ture of camps and also enables an appreciation of the evolution of the form, layout and components of a camp.

A significant source for Roman military camps dating from the High Empire is *Liber de munitionibus castrorum* (Fortifying a Roman Camp). This is by an anonymous Latin author; the text was bound in a volume with several survey works and, because the text included a later addition wrongly attributing it to the surveyor Hyginus Gromaticus, the author is referred to as Pseudo-Hyginus.¹⁶² The beginning of the text is missing and some consider that the end has also been lost; the text is difficult to read.¹⁶³ The dating of the text is unknown, with dates suggested between the rule of Domitian and Trajan, although the most likely dates are between Trajan and Marcus Aurelius.¹⁶⁴ Jones favours a date in the reign of Marcus Aurelius.¹⁶⁵ Furthermore, the inclusion in the text of references to Pannonian cavalry suggest it related to a camp on the Danubian frontier.¹⁶⁶ Thus, it is likely to date from the beginning of camp construction near Klisina.

Pseudo-Hyginus starts with an explanation of how soldiers' tents are pitched and their space requirements. Each tent occupies a width of 10 feet, increased by 2 feet to permit pitching, with each tent occupied by 8 men (a *contubernia*), with a century of 80 soldiers occupying 10 tents for a length of 120 feet. These are in strips of 60 feet.¹⁶⁷ An infantry cohort has 10 centuries and camps in 100 tents.¹⁶⁸ He then calculates the area required, based on 3 legions plus others. He then describes various space requirements based on the force composition.

Pseudo-Hyginus outlines the shape of a Roman camp as a rectangle in the proportions of 2:3, which is characteristic of the camps in the imperial period.¹⁶⁹

¹⁵⁶ Salvatore 1996, 139.

¹⁵⁷ Dobson 2008, 55.

¹⁵⁸ Dobson 2008, 54.

¹⁵⁹ Dobson 2008, 71.

¹⁶⁰ Dobson 2008, 43–46.

¹⁶¹ Keppie 1984, 44.

¹⁶² Campbell 2018, 1; Lenoir 1979; Pérez 2019, 48.

¹⁶³ Campbell 2018, 2.

¹⁶⁴ Campbell 2009.

¹⁶⁵ Jones 2012, 34.

¹⁶⁶ Jones 2017, 522.

¹⁶⁷ *Liber de munitionibus castrorum*, 21; Campbell 2018, 39.

¹⁶⁸ *Liber de munitionibus castrorum*, 28; Campbell 2018, 47.

¹⁶⁹ *Liber de munitionibus castrorum*, 1; Campbell 2018, 17.

He identifies the location and space requirements for the legionary troops, the imperial guard, the *praetorium*, cavalry and allied forces in significant detail.¹⁷⁰

It has been suggested by Gilliver that Pseudo-Hyginus was not only summarising current knowledge about camps, but was perhaps proposing a new theory for camp organisation.

The layout and space requirements outlined by Pseudo-Hyginus are noticeable denser than those outlined by Polybius. In the Pseudo-Hyginus camp, an infantry cohort of 6 centuries of 480 men had 1.5 actus quadratus, less than in the Polybian camp.¹⁷¹ Hence, an issue with Pseudo-Hyginus according to Gilliver is to what extent is he reflecting current practice and to what extent is it a new theory.¹⁷² Gilliver questions the troop density proposed by Pseudo-Hyginus and considers it is impossible to accurately assess the size of an army solely from its marching camp.¹⁷³

The camp of Pseudo-Hyginus has two principal roads at right angles, the *via praetoris* and the *via principalis*, and these meet at the centre of the camp.

The summer camp is defended by five means: a ditch, rampart, ‘little stags’ (tree trunks with branches), weapons, and an embankment.¹⁷⁴

Pseudo-Hyginus refers to the surrounding ditch, which could be either the pointed or Punic type.¹⁷⁵

Pseudo-Hyginus notes that the corners of the camp are rounded, as corners weaken the defence.¹⁷⁶

In terms of the location of the camp, he favours gently rising terrain above a plain, then a plain, then a hill or mountain and finally elsewhere, when there is no alternative.¹⁷⁷

Pseudo-Hyginus’ account is a complex and detailed outline of the positioning and distances of the internal elements on a camp. These are best outlined diagrammatically, a task which has been undertaken by Campbell and is reproduced below.¹⁷⁸

Pseudo-Hyginus’ camp design is for a hypothetically sized army of some 41,000 soldiers; the size of the camp was 34.9 hectares, with 1,174 troops per hectare.¹⁷⁹ In the Pseudo-Hyginian camp, each infantryman and those auxiliary units without cavalry had 45 square feet of tent space, compared to 83.33 square feet in the Polybian camp, a 54% reduction. The cavalry had 90 square feet or twice that of the infantry, not 4 times, as in the Polybian camp, a 27% reduction. A cohort of legionaries (480 men), thus, occupied 1.5 actus quadratus, while a *turma* (a cavalry unit) took up 0.1875 actus quadratus. In the mixed auxiliary units, *cohors equitatae*, the men had less space, with infantrymen having 36 square feet and cavalrymen 81 square feet.¹⁸⁰ Pseudo-Hyginus has an *intervallum* of 60 Roman feet (1/2 actus), while the Polybian camp had an *intervallum* of 1½ actus, or 200 Roman feet.¹⁸¹

The space allocations in Pseudo-Hyginus’ camp are considerably reduced from the allocations in the Polybian camp. Richardson notes: “*Compared with the Polybian model, the Hyginian model greatly reduced the area and perimeter length for any given force, thus enabling the army to adopt a more aggressive posture.*”¹⁸²

The key implication of the reduced space requirements for the Pseudo-Hyginian camp when compared to the Polybian camp is that considerably less effort per person was required to dig the outer ditch and construct the rampart. This enabled camp construction to be speedier and more efficient. However, the question is whether the space allocations in Pseudo-Hyginus represented actual practice at the time, or whether, as Gilliver suggests, they are proposals by Pseudo-Hyginus for a new theory of camp design. Richardson indicates they were ones in use rather than a proposed new theory, reflecting increased professionalism of the army and greater attention to effective and efficient deployment of resources.¹⁸³ Also, Pseudo-Hyginus’ camp design includes provision for the Praetorian Guard, suggesting the design was one where the emperor would be personally present.¹⁸⁴

Pseudo-Hyginus provides us with the best description of a Roman camp dating to the imperial era; it provides general principles for camp design, but the internal dimensions and components relate to a camp for troops commanded by an emperor with 41,000 troops and operating on the Danubian frontier. Conse-

¹⁷⁰ Jones 2012, 38–39.

¹⁷¹ Richardson 2000, 428.

¹⁷² Gilliver 1993, 232.

¹⁷³ Gilliver 1993, 87.

¹⁷⁴ *Liber de munitionibus castrorum*, 48; Campbell 2018, 67.

¹⁷⁵ *Liber de munitionibus castrorum*, 49; Campbell 2018, 69.

¹⁷⁶ *Liber de munitionibus castrorum*, 54; Campbell 2018, 71.

¹⁷⁷ *Liber de munitionibus castrorum*, 57; Campbell 2018, 75.

¹⁷⁸ Campbell 2018, 79.

¹⁷⁹ Gilliver 2001, 86–87.

¹⁸⁰ Richardson 2004, 26.

¹⁸¹ Richardson 2000, 426, 428, 430.

¹⁸² Richardson 2003, 303.

¹⁸³ Richardson 2004, 26.

¹⁸⁴ Jones 2012, 34.

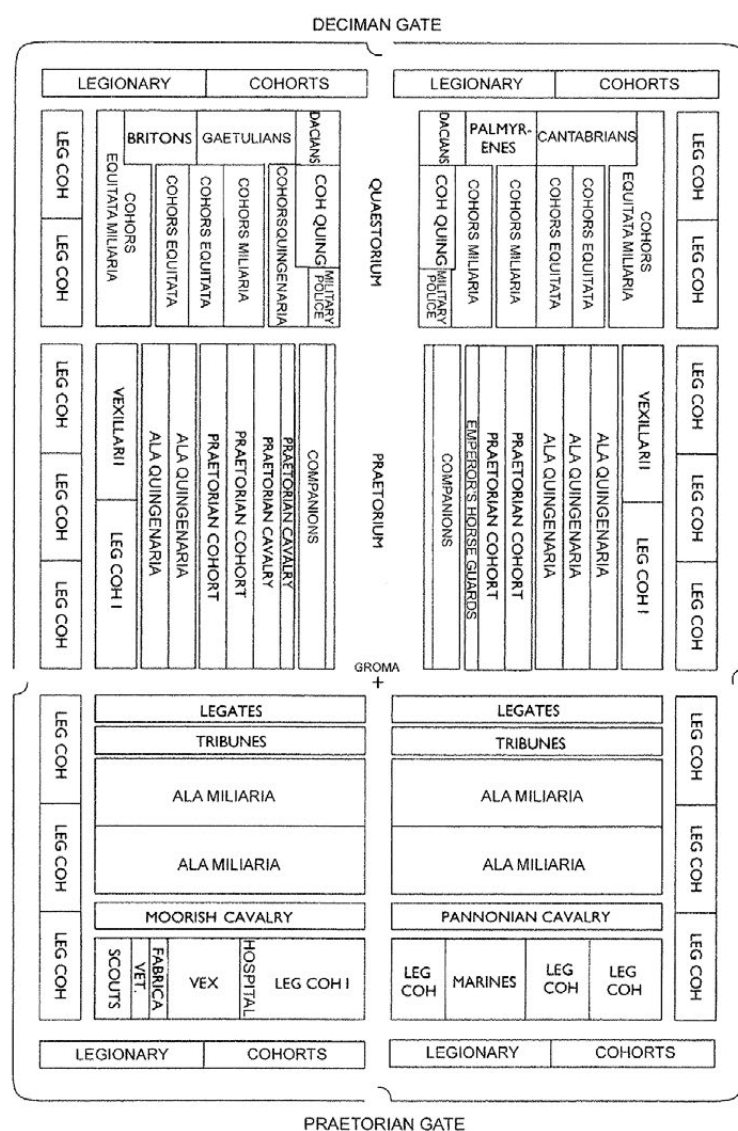


Fig. 10. Campbell's suggested plan of Pseudo-Hyginus' Camp

Сл. 10. Предложени Кембелов йлан
војної лоїора Псеудо-Хиїна

quently, many of the internal dimensions and components are not directly applicable to camps for forces of differing structures, components, and size. However, given the specific force composition he describes, it is useful as a starting point when considering the camps near Sirmium.

Onasander was a Greek philosopher who wrote the *Strategikos* (Στρατηγικός), a short but comprehensive work on the duties of a general, which was dedicated to Quintus Veranius, a Roman general and governor of Britain under Nero. The *Strategikos* was written in 49 to 59 CE and it was the main source used for the military writings of emperors Maurice and Leo VI.¹⁸⁵ Onasander makes some observations regarding the siting of military camps and the need to change locations due to the fouling of the soil by waste.¹⁸⁶

Publius Flavius Vegetius Donatus (Vegetius), who appears to have been a bureaucrat in imperial service with no personal military experience, wrote *Epitoma Rei Militaris*, the Epitome of Military Science, likely for the emperor, probably Theodosius I (reigned 374–395 CE).¹⁸⁷ Vegetius' text is interesting in that it gives a perspective about camps in the late 4th century and proffers some different view to those from the Republican and early Imperial periods. Vegetius indicates that by the late 4th century, the practice of building

¹⁸⁵ Illinois Greek Club 1928, 347–348; Smith 1998.

¹⁸⁶ Onasander, *Strategikos* VIII–IX; Illinois Greek Club 1928, 405–407.

¹⁸⁷ Miller 2011, xiii, xxxvii.

camps had ceased and was largely forgotten.¹⁸⁸ Southern and Dixon note that the only known example of a late Roman marching camp is at Ermelo in the Netherlands, possibly built during Julian's campaigns, but Maurice's *Strategikon* indicates that the Byzantine army knew how to build camps as it contains a description of a camp and instructions on how to build one.¹⁸⁹

Given the literary sources about camps near Sirmium, it is likely that some of the camps near Klisina would be late Roman as well.

Furthermore, Vegetius misunderstands the rationale for a marching camp, as they were not designed to withstand a siege, but rather were the platform from which to strike out and attack. Camps in the early and middle imperial periods were not intended to be fortresses¹⁹⁰

Vegetius makes observations on the siting of camps:

"1.22. In what kind of places camps should be built.

*Camps – especially when the enemy is near – should be built always in a safe place, where there are sufficient supplies of firewood, fodder and water; and if a long stay is in prospect choose a salubrious site. Care must be taken lest there be a nearby mountain or high ground which could be dangerous if captured by the enemy. Thought must be given that the site is not liable to be flooded from torrents and the army to suffer harm in this event. The camp should be built according to the number of soldiers and baggage-train, lest too great a multitude be crammed in a small area, or a small force in too large a space be compelled to spread out more than is appropriate".*¹⁹¹

Vegetius' guidelines for site selection reflect earlier practice as do his comments of space requirements and the positioning of gates; but his comments on the shape of a camp are very much at odds with earlier practice. Perhaps this reflects the extent to which the erection of camps had fallen into disuse.

Vegetius identifies the management responsibility for camp establishment lay with a Prefect of the Camp.¹⁹²

Vegetius writes:

*"3.8. When surveying a camp, it is not sufficient to choose a good site But the surveyors should calculate the square footage of the site-plan so that the area enclosed corresponds to the size of the army. Cramped quarters constrict the defenders, whilst unsuitably wide spaces spread them thinly."*¹⁹³

This suggests the existence of a formula for calculating the area of a camp based upon force composition, a matter which will be considered later when considering the work of Richardson.

Marching camps receive no mention in Frontinus' *Strategems*, written in the 1st century CE, or in Arrian's *Ektaxis kat' Alanōn*, *Deployment Against the Alans*, written in the mid-2nd century CE, or in Aeneias the Tactician: *How to Survive Under Siege*, written in the mid-4th century CE.¹⁹⁴ There are literary reference to camps by Josephus,¹⁹⁵ Livy,¹⁹⁶ and Caesar,¹⁹⁷ but these do not add to the material already considered previously.

Towards a Classification and Typology of Roman Military Camps

Ancient authors used a range of terms to describe Roman military camps. Polybius, writing in Greek, refers to *stratopedon* to describe temporary army camps, but the term is ambiguous and used by Polybius to refer to not only camps, but also the Roman army and individual legions.¹⁹⁸ A camp is referred to as a *castra*, irrespective of its size. Winter camps are called *castra stativa*, *castra hiberna*, or simply *hiberna*, and were usually permanent fortresses. These are distinguished from summer camps, *castra aestiva*, built at the end of each day of a campaign. A *castellum* is a small camp, while *burgis* used in connection with soldiers was a tower, and *burgis specularis* was to ensure the supervision and policing of roads and to maintain law and order in villages. *Turris* and *burgis* were small enclosures, isolated towers serving as observation posts, information relays and advanced defences.¹⁹⁹

The seasonality of types of camps was important in the colder northern regions, and in Republican

¹⁸⁸ Vegetius, *Epitome of Military Science* 1.21; Miller 2011, 23.

¹⁸⁹ Southern, Dixon 1996, 132; Johnson 1983, 32; Maurice, *Strategikon* 12.22.

¹⁹⁰ Fischer 2019, 225.

¹⁹¹ Vegetius, *Epitome of Military Science* 1.22–23; Miller 2011, 23–24.

¹⁹² Vegetius, *Epitome of Military Science* 2.10; Miller 2011, 42.

¹⁹³ Vegetius, *Epitome of Military Science* 3.8; Miller 2011, 80.

¹⁹⁴ Bennett 1925; Campbell 2022; Whitehead 2001.

¹⁹⁵ Le Bohec 1994, 132; De la Bédoyère 2020, 111.

¹⁹⁶ Gilliver 2001, 63.

¹⁹⁷ De la Bédoyère 2020, 110.

¹⁹⁸ Pérez 2019, 8.

¹⁹⁹ Le Bohec 1994, 155–156.

Type of Roman Military Site	Description
Fortress	Permanent base for one or more legions. 20 ha or more.
Vexillation fortress	Large fort of c. 8 – 12 ha, assumed to hold a mixed force of legionary cohorts and auxiliaries.
Fort	Garrison post occupied by an auxiliary unit or units. Normally 1 – 6 ha.
Fortlet	Garrison post large enough to hold only part of an auxiliary unit.
Marching camps	Earthwork temporarily occupied by a tented force on campaign or otherwise away from base.
Construction camps	A camp temporarily occupied for the purposes of construction.
Siege camps	A camp temporarily occupied for the purposes of a siege.
Practice camps	Earthworks often of very small size or present in unusual numbers, thought to be use for training troops in ditch digging, rampart construction and the turning of rounded corners.

Table 1. Classification of Roman military sites according to Lepper and Frere

Табела 1. Класификација римских војних локалитетима према Лејперу и Фреру

times with citizen soldiers who needed to return for harvest. It appears that the description of types of camps by ancient authors were based on seasonality.²⁰⁰ Campbell notes:

*“In winter, the troops were scattered and stationed in winter quarters, before being assembled in camps for summer campaigns. These camps and winter quarters were not permanent, though they might have stone-built accommodation, especially in the cold northern provinces.”*²⁰¹

With the establishment of permanent bases for legions and auxiliaries in the early empire, troop mobility became less easy and in the late 1st century CE, it became common practice to transfer temporary detachments (*vexillationes*) from a legion or auxiliary unit to wherever they might be required.²⁰²

The identification of whether a camp was used in summer or winter generally eludes modern archaeologists, and so, even if the ancient authors had a consistent nomenclature for camps (which is unlikely), we are unable to use this to classify Roman camps.

Breeze notes that it is misleading to try and categorise forts too closely or to write about “fort types”.²⁰³ Modern authors have taken up the task of attempting to classify Roman military camps. Lepper and Frere have provided what has been generally accepted as a classification of Roman military sites.²⁰⁴ They propose the following classification (Table 1).

They reject the use of the term “temporary camp” and instead use “marching camp.”²⁰⁵ The last three categories of camp are based upon a purpose or function. The classification of Lepper and Frere has been adopted by Jones, although she considers an alternative to marching camps is campaign camps.²⁰⁶ Lepper and Frere note that most camps are marching camps, but a few can be identified as construction camps, siege camps and practice camps.²⁰⁷ It will be noted that the Lepper and Frere classification was largely based on the corpus of camps then known, being camps primarily from Britain; thus, not including a range of camp types evident from more recent surveys in continental Europe.

Some attempts have been made to define camp as opposed to the categories of forts. Thus, Welfare and Swan wrote that: “A Roman camp was a lightly built but effective defensive enclosure constructed to accommodate highly mobile troops ‘under canvas’ or, more

²⁰⁰ Jones 2017, 521; Hanel 2007, 407.

²⁰¹ Campbell 1994, 79.

²⁰² Campbell 1994, 80.

²⁰³ Breeze 2002, 7.

²⁰⁴ Lepper, Frere 1988, 260–263.

²⁰⁵ Lepper, Frere 1988, 261.

²⁰⁶ Jones 2009, 21; Jones 2012, 19; Jones 2017, 522–523.

²⁰⁷ Lepper, Frere 1988, 263.

accurately, in tents made of leather.”²⁰⁸ Jones adopts a simplified definition: “Temporary camps are enclosures constructed by the Roman army that were not intended for permanent occupation (unlike, for example, forts and fortresses)”²⁰⁹ or more fulsomely: “Roman camps are temporary fortifications constructed by troops on campaigns or manoeuvres. Unlike constructions designed for more permanent occupation, these are usually occupied for only a few days or weeks and leave limited archaeological evidence, with no fixed internal structures.”²¹⁰ Both definitions are not wholly satisfactory, with the first requiring tented accommodation whereas, in some instances, more solid building materials such as wood, stone and bricks were used for such camps, while the second relies on an intention of the builders, which cannot be determined in most cases. As Leslie points out, the classifications of Lepper and Frere relies not on observable archaeological evidence, but on a conceptualisation of function.²¹¹ Welfare and Swan favour the generic term “Roman camp” rather than seeking any more precise definition. They state: “This generic term encompasses the various functional categories that have been assigned, usually with little concrete evidence, to some sites in the past: ‘marching camps’, ‘labour camps’ and ‘practice camps’.”²¹² The problem with the category of ‘marching camp’ is that it implies it is a camp erected while the army is on the move, and refers generally to overnight encampments while the army is travelling. The term ‘campaign camps’ suggested by Jones provides a more accurate and preferable term for camps built in the course of a military campaign, rather than a ‘marching camp’, which refers to an army on the move. There are other types of camps in addition to overnight camps while the army is on campaign, such as assembling camps for an army to gather at the beginning of a campaign and base camps, where an army on campaign is based for part of the campaign season for its operations and from which it undertakes manoeuvres, operations, or regrouping.

Leslie argues that camps should be defined by reference to the physical remains of their works, arguing the primacy of archaeological characteristic, rather than literary sources or imputed functional types.²¹³ He notes that early definitions relied on literary sources and that archaeological evidence was added as a poor relation to the literary evidence.²¹⁴ He also challenges the validity of imputing functional variation to camps and whether these different functional types can be distinguished on archaeological grounds.²¹⁵

Leslie argues that camps should be classified on the basis of the nature of the occupation itself; he considers that camps should be classified in terms of the buildings and other direct evidence of the nature of the occupation.²¹⁶ He notes that if a temporary camp is truly temporary, then tented accommodation would be used, and that locations with barracks, granaries or other formal buildings cannot be temporary.²¹⁷ He, therefore, proposes a category of semi-permanent camps.²¹⁸ It is important to note that Leslie does not consider the type of building material used to be a basis of classification, but rather what buildings tell us about the duration and character of occupation.²¹⁹ He wrote: “*Thus, it is not the presence of stone buildings as opposed to timber buildings, or both as opposed to turf constructions, that allows us to gauge the duration of occupation, but the very presence of buildings and the investment of time and effort they represent which informs us of the site’s character.*”²²⁰

The approach of Leslie has merits in emphasising the importance of site classification being based primarily on its archaeological characteristics, and his consideration of the presence of buildings is important in differentiating overnight stops from occupation of longer durations; but the discernment of a site’s character and duration of occupation does impute functional characteristics.

Rather than using the term ‘marching camps’ or ‘temporary camps’, we prefer the term ‘campaign temporary camps’ for non-permanent facilities for accommodation units of the Roman army on campaign. Additionally, the classifications need to encompass the evidence of camps more recently located in Eastern Europe and the Balkans. Taking these camps into consideration, these campaign temporary camps can then be subdivided into:

²⁰⁸ Welfare, Swan 1995, 1.

²⁰⁹ Jones 2009, 21.

²¹⁰ Jones 2012, 19.

²¹¹ Leslie 1995, 61.

²¹² Welfare, Swan 1995, 2.

²¹³ Leslie 1995, 53.

²¹⁴ Leslie 1995, 54.

²¹⁵ Leslie 1995, 53–54, 60.

²¹⁶ Leslie 1995, 63–64.

²¹⁷ Leslie 1995, 63.

²¹⁸ Leslie 1995, 61.

²¹⁹ Leslie 1995, 65.

²²⁰ Leslie 1995, 65.

- temporary overnight and short-term campaign encampments,
- temporary campaign command and logistics base camps,
- temporary campaign surveillance and control camps, and
- temporary campaign assembling camps.

An additional category of semi-permanent camps or long-term camps, as suggested by Leslie, is also required for the winter accommodation for an army where field campaign operations were confined to the summer or for areas with ongoing military campaigns.

Archaeological Evidence of Temporary Roman Campaign Camps

The archaeological evidence of temporary Roman campaign camps is usually primarily obtained by remote means by the identification of the boundary ditches through crop marks. As Webster noted: “Archaeologically, the remains of these marching camps are very slight and often all that survives is the surrounding ditch.”²²¹ The surrounding ditch and rampart may be discernible on the ground by way of variations in elevation, although such variations may be obliterated by intensive ploughing. Traces of internal buildings are rare as they usually consisted of tents.²²²

The shape of a temporary campaign camp is characteristically square for earlier Republican camps and rectangular for imperial camps, with the most common ratio of imperial camps being 2:3.²²³ Other ratios found are 4:5 and 5:6.²²⁴ Also, camps usually have four entry gates, which may be discernible as either a gap in the ditch and rampart outline or by the types of gates, primarily a short ditch in front of the gate gap (*titulum*) or a ditch and fence forming an outward curve requiring an oblique approach (*clavicula*).²²⁵ The *claviculae* type could be internal as well as external facing, and there was a unique British gate, the Stracathro type with an oblique length of rampart and ditch on the outside of the gateway.²²⁶ In Britain, the *tituli* gates are found in 45% of gates, the *claviculae* type in 9% of gates, and simple gates in 23% of gates.²²⁷ Another feature that may be observed is the presence of rounded corners to the square or rectangular shape, resembling a playing card.²²⁸ Pseudo-Hyginus suggests the origin of the rounded corners was derived from stone walls, as it is easier to remove stones from a sharp angled corner of a wall.²²⁹ While most temporary Roman camps conform to the playing card shape, a significant proportion do not.²³⁰

The central part of the camp is the *principia* or administrative centre, with a central courtyard.²³¹ If a camp is constructed with structures other than tents, the *principia*, and the commanding officer’s quarters, the *praetorium*, may exhibit different surface conditions. Between the occupied part of a camp and the defensive perimeter of the rampart and ditch is a space called the *intervallum*, designed to provide protection and for the marshalling of troops.²³²

The ancient literary sources previously discussed identify a number of locational considerations in the siting of a camp, such as nearby supplies of wood and grain, close to water supplies, not in marshy ground or land liable to flooding, in healthy locations, not overlooked by higher ground, and not close to forests, gullies or valleys.²³³ According to Vegetius, camps should face east or towards the enemy, or the direction of marching.²³⁴

The presence of internal structures other than tents was influenced by the duration of stay, the role of the camp (whether it was a base camp, an assembling camp, or a campaign camp), the season of use, the local climatic conditions, and the availability of building materials, such as timber, stone, and bricks. In the colder northern European areas, leather tents were not suitable for men and food stores for an extended period. In Gaul, Caesar’s winter quarters had timber buildings thatched with straw.²³⁵ Caesar noted that in Gaul “... as the rain continued it was impossible to keep the men under canvas any longer.”²³⁶ The solution was either construct accommodation using timber and stone or billet the troops. Campbell notes: “in winter, the troops

²²¹ Webster 1979, 172.

²²² Fischer 2019, 240.

²²³ Le Bohec 1994, 132.

²²⁴ Richardson 1997, 48.

²²⁵ Webster 1979, 174; Gilliver 2001, 78–79.

²²⁶ Wilson 1974, 343–344.

²²⁷ Jones 2012, 87.

²²⁸ Jones 2012, 83.

²²⁹ Fischer 2019, 227.

²³⁰ Leslie 1995, 90.

²³¹ Webster 1979, 193; see also Hanel 2007, 407.

²³² Richardson 2004, 5.

²³³ Gilliver 2001, 70.

²³⁴ Vegetius, *Epitome of Military Science* I, 23; Richardson 2005.

²³⁵ Caesar, *Gallie Wars*, 5.43.

²³⁶ Caesar, *Gallie Wars*, 3. 29.

were scattered and stationed in winter quarters, before being assembled in camps for summer campaigns. These camps and winter quarters were not permanent, though they might have stone-built accommodation, especially in the cold northern provinces."²³⁷

The legionary fortress at Inchtuthil in Perthshire in Scotland built between 83 and 86 CE covers 22 ha has buildings of timber framed construction and has three camps outside the fortress probably for the construction team. It was occupied for less than three years and then carefully demolished before it was completed as a result of a change in policy. It is unclear whether Inchtuthil was intended as a campaign operational base camp or whether it was intended to be a permanent fortress.²³⁸

In camps utilised for short periods, some evidence of internal activities can occasionally be discovered. At the Roman marching camp near the River Ayr, South Ayrshire, Scotland dating to the Flavian period, 26 carefully positioned fire pits were found within the camp in 2 parallel rows, 30 m apart. These were identified as field ovens, probably used for domestic cooking.²³⁹ Similarly at excavations at the camp at Kintore near Aberdeen in Scotland, 180 Roman ovens and numerous pits were recorded;²⁴⁰ while two rows of pits were found in the camp at Dalginross in Perthshire,²⁴¹ and numerous pits were found in a camp at Glenlochar in Dumfriesshire.²⁴²

There is no evidence that it was usual practice to level the remains of camps and backfill their ditches after their use.²⁴³ Occasionally, camps were re-used where there was no fouling from the previous occupation.²⁴⁴

In addition to the evidence of camps obtained by archaeological survey and excavation, there is remarkable evidence for Roman military camps in some of the scenes of Trajan's Column in Rome. These show the delineation of the camp (scenes iii – v), the construction of the rampart (scenes xix – xx) and the digging of the ditches (scene lx).²⁴⁵

In Britain, nearly 500 Roman military camps have been identified, many through the use of aerial photography.²⁴⁶ Britain is remarkably rich in the archaeological remains of Roman campaign camps, particularly so in the extremities of the country in Scotland, Wales, and the Marches.²⁴⁷ However, subsequent land use has a significant impact of the visibility of camps, with repeated ploughing obscuring or obliterating their visibility.²⁴⁸

Ever since the early antiquarians there has been a strong interest in the identification of Roman military

campaign camps in Britain, starting with the work of General William Roy in the 18th century, followed by the pioneering work in the 20th century by Sir Ian Richmond and Kenneth St Joseph, followed by the inventory work of Humphrey Welfare, Vivien Swan, and Rebecca Jones.²⁴⁹ The preponderance of finds of Roman military campaign camps in Britain as compared to continental Europe may have reflected the availability of aerial photography there and the interests of scholars, or differences in land use affecting the survival of camp remains, rather than some difference in the use of camps by the Romans. However, more recent examinations have identified many Roman military campaign camps in Eastern Europe and the Balkans, suggesting the previous relative paucity of finds simply reflected restricted availability of aerial photography and the priority of researchers, rather than an absence of camps.

A large number of Roman military camps have been identified in Eastern Europe, predominantly in Barbaricum and near the Danube in Hungary, Slovakia, the Czech Republic, and Romania.²⁵⁰ Perhaps the largest concentration of military camps in Eastern Europe have been found on the right bank of the Danube at Brigetio, modern Komárom-Szöny, in Hungary and on the opposing left bank of the Danube at Iža-Leányvár in Slovakia. In Brigetio, at least 18 Roman military camps have been identified and in Iža 5 Roman military camps have been identified.²⁵¹ The camps are adjacent to the permanent legionary fortress in Brigetio.²⁵² These camps relate to the period of the Marcomannic Wars of Marcus Aurelius. Excavations

²³⁷ Campbell 1994, 79.

²³⁸ Pitts, St Joseph 1985, 31, 270–280; Shirley 2000, 1–7.

²³⁹ Arabolaza 2019, 331–343.

²⁴⁰ Jones 2014, 174–175.

²⁴¹ Rogers 1993.

²⁴² Jones 2014, 178.

²⁴³ Leslie 1995, 117–118.

²⁴⁴ Jones 2012, 70.

²⁴⁵ Richmond 1982, 11–15, 21–25.

²⁴⁶ Jones 2012, 10.

²⁴⁷ Leslie 1995, 7.

²⁴⁸ Leslie 1995, 8.

²⁴⁹ Macdonald 1917; Richmond 1940; Welfare, Swan 1995; Jones 2012; Leslie 1995, 12–16; Davies, Jones 2006; Jones 2011.

²⁵⁰ Komoróczy 2009.

²⁵¹ Viszy 2003, 78–79, 197–198.

²⁵² Farkas, Fábíán, Fodor 2020; Kass 2020.

at the camps at Brigetio identified the morphology of the ditches, metal objects and coins, and emphasised the importance of using metal detectors in the survey of camps.²⁵³

Recent work has identified two lines of temporary Roman campaign camps heading well north of the Danube and into Barbaricum, one originating at Carnuntum in Austria, and the second originating at Brigetio and Iža in Hungary and Slovakia respectively, both associated with the Marcomannic wars of Marcus Aurelius. North of Carnuntum, following the valley of the river Marus in the territory of the Marcomanni, there is a large number of temporary Roman campaign camps. At Mušor-Burgstall (Hradisko) in the Czech Republic, the buildings include a bathhouse and residential buildings with underfloor heating.²⁵⁴ It was likely a command and logistics base during the Marcomannic Wars and west of the Little Carpathians there is evidence of 26 military camps in a total of 16 localities.²⁵⁵ The camp at Jevíčko in Moravia in the Czech Republic was the northernmost temporary Roman campaign camp in Central Europe.²⁵⁶ The camps are located in the first river terrace above the alluvial plain and are oriented towards the watercourses. There are three categories of camps: camps with fortifications for very large contingents, covering 37 to 40 ha, camps for tactical combat units, covering 20 to 26 ha, and camps for small units for river control and the supervision of locals, covering 4 to 11 ha.²⁵⁷ Geophysical evidence suggests the presence in some of ovens on the edge of the *intervallum*.²⁵⁸ These camps indicate a number of features: firstly that camps were often located to protect supply lines, particularly along rivers; secondly that for temporary campaign camps, some could serve as command and logistics bases or hubs, others served an active role in the campaign, while others were for the supervision and consolidation of controlled areas; and thirdly some of the camps took on the character of semi-permanent camps.

The camps north of Brigetio follow a similar pattern along the river Duria in the territory of the Quadi, with Vráble the base. Some 25 to 27 camps have been identified.²⁵⁹ However, the camps north of Brigetio are not as extensive and well developed as those north of Carnuntum, probably because the highest concentration of the Marcomannic population was deep inside Barbaricum near Mušov, far from the Roman frontier, unlike the Quadi population, which was centred closer to the Roman frontier.²⁶⁰

Survey work in the Lower Danube region has identified four camps at Carcaliu, Istria, Ovidiu and Căscioarela, while a series of camps have been identified well beyond the Danube in Wallachia at Vâlclo, Măreulești-Gară, Filipești and Roșioru.²⁶¹ These appear to be part of a forward military position to establish a buffer zone for the province of Moesia Inferior.

In Serbia, temporary campaign camps are poorly researched. In addition to the Klisina camps, there is only one that has been surveyed and excavated, in the village of Kremna in south-west Serbia, dated to the 1st century.²⁶²

Estimating the Force Size within Camps

The size of a camp ought to reflect the number and type of troops accommodated within it.²⁶³ Many attempts have been made to calculate the capacity of camps, expressed as numbers of soldiers per hectare. Jones surveyed the range of estimates and favoured an estimate at the lower end of the scale, between 480 to 690 men per hectare.²⁶⁴ She notes: “*Despite the various valiant attempts that have been made to assess the number of troops quartered within a camp, they are subject to numerous variables: topography, the ratio of legionaries to auxiliary troops, the ratio of infantry to cavalry, the number of mules and size of baggage train, the possible availability of space for camp followers, the space allocated to the principia, and the potential presence of the emperor and his large household in some circumstances.*”²⁶⁵

The most valiant attempts have been made by Alan Richardson. His results provide a well-reasoned approach to discerning the theory underlying the layout of camps, an approach that has not been the subject of any detailed rebuttal, other than general traverses. Underlying Richardson’s approach is that camp surveyors

²⁵³ Farkas, Fábán, Fodor 2020; Kass 2020.

²⁵⁴ Hüssen *et al.* 2020, 13.

²⁵⁵ Hüssen *et al.* 2020, 15.

²⁵⁶ Droberjar 2020, 485.

²⁵⁷ Hüssen *et al.* 2020, 16.

²⁵⁸ Hüssen *et al.* 2020, 18.

²⁵⁹ Hüssen *et al.* 2020, 24.

²⁶⁰ Hüssen *et al.* 2020, 30–31.

²⁶¹ Țentea, Matei-Popescu 2023.

²⁶² Mihajlović 2023, 103, 104, Fig. 1; Mihajlović *et al.* 2024.

²⁶³ Jones 2012, 47.

²⁶⁴ Jones 2012, 48–58.

²⁶⁵ Jones 2012, 37.

had a ready method of determining the size of a camp by determining the length of the axes set out from the *groma* of the camp. He noted that this approach could not be achieved by simply adding together squares as such an approach does not enable you to achieve the set ratios for the sides.²⁶⁶ He notes that for a surveyor to quickly lay out a camp, there must have been a simple and easily useable formula; Vegetius refers to a technique for laying out a camp, but does not give it.²⁶⁷ Richardson proposes a formula to calculate the length of the camp's *cardo* and *decumanus*, based on the required area.²⁶⁸ To calculate the required area, he used the space allocations for all units to give the tented area, which is then adjusted to give extra area for the principia, and for the proportion of cavalry to determine the sides of the camp, then to this you add the size of the intervallum.²⁶⁹ Based on the space allocations in Pseudo-Hyginus' camp, Richardson concludes: "Therefore, to obtain a reasonable estimate of the nominal cohorts in camps whose acreages are given 'over the ramparts', simply divide the acreage by 0.981. Likewise, for areas given in hectares, divide by 0.397."²⁷⁰ Richardson uses the concept of notional cohort values to accommodate the different area requirements for infantry and cavalry, which have twice the area per person as infantry, in circumstances where the relative proportion of infantry and cavalry is unknown.²⁷¹ Thus, a notional cohort consists of 480 infantry or 240 cavalry (8 *turmae* of cavalry, each of 30 men).²⁷² He notes: "*There is evidence to suggest that a legion often operated in a field army comprising 32 notional cohorts such that 12 notional legionary cohorts brigaded with 20 notional cohorts of infantry and cavalry.*"²⁷³

Richardson proposes a series of equations to calculate the length of the sides or axes of a square camp and, thereafter, for the areas of camps, extrapolating from Pseudo-Hyginus and using intuitive reasoning.²⁷⁴

Applying Richardson's paradigm of the Pseudo-Hyginian imperial army camp, a camp for one legion of 12 notional cohorts would require an area of 37.44 *actus quadratus* or 4.725 ha and a camp for a vexillation of half a legion of 6 notional cohorts would require an area of 18.7 *actus quadratus* or 2.36 ha.²⁷⁵

Richardson considered that the ratio of 2:3 had some mystical significance to the Romans.²⁷⁶

When making a camp, there were three steps: First clear the site, second mark out the rectangle, and third mark out the rampart and ditch. The greatest amount of labour would be required for the construc-

tion of the ditch and rampart. As the size of a camp gets bigger, the perimeter does not increase at the same rate.²⁷⁷ Hence, the bigger the camp, the quicker it would have been to dig the ditch and make the rampart.

An analysis of the size classes of Roman military camps provides an indication of the force structure utilised. In reviewing the size classes of Roman military camps in Britain, 68% of camps are less than 1.9 ha, indicating that these camps housed forces of less than half a legion.²⁷⁸

While it is difficult to verify the accuracy of Richardson's model, it provides a useful working model. The one potential issue is that Richardson's model does not include the presence of camp followers in the camps. Valerius Maximus recounted that in the late 2nd century BCE, the consul Metellus expelled camp followers who mingled with the soldiers and remained with them day and night.²⁷⁹ Scipio Africanus the Younger expelled traders, prostitutes, clairvoyants, and diviners on his arrival at the camp at Numantia in the 2nd century BCE.²⁸⁰ Hence, it appears the presence of camp followers in camps may have been usual practice. If this was the case, then their exclusion from the calculations of Richardson would impact on the accuracy of his paradigm. Jones writes: "*This may be because their inclusion in the camp was seen as bad practice, therefore having no place in military manuals, rather than reflecting actuality.*"²⁸¹

²⁶⁶ Richardson 1997, 49.

²⁶⁷ Vegetius, *Epitome of Military Science*, I, 21; Miller 2011, 23.

²⁶⁸ Richardson 1997, 50–52.

²⁶⁹ Richardson 2000, 427.

²⁷⁰ Richardson 2000, 431–431.

²⁷¹ Richardson 2002, 94.

²⁷² Richardson 2002, 104; Richardson 2003, 303.

²⁷³ Richardson 2002, 97.

²⁷⁴ Richardson 2004, 24.

²⁷⁵ Richardson 2004, 31.

²⁷⁶ Richardson 2001, 173–174; 183.

²⁷⁷ Richardson 20013, 306.

²⁷⁸ Welfare, Swan 1995, 11.

²⁷⁹ Valerius Maximus, *Memorable Facts and Sayings*, II. 7. 1–2.

²⁸⁰ Appian, *Iberica*, 85.

²⁸¹ Jones 2014, 173.

²⁸² See footnote 2.

Analysis of the Klisina Camps

The Glac Survey initiated a land systems analysis of the Glac Survey Study area.²⁸² The Land System analysis indicates that the Klisina area is on the southern edge of the Fan Srem Land System, 30 metres north of the boundary of the River Terrace Land System. Figure 11 shows the land systems in the area around Klisina and the location of rural farmhouse complexes.

The ancient literary sources previously discussed, particularly Vegetius and Pseudo-Hyginus, identify a number of locational considerations in the siting of a camp, such as nearby supplies of wood and grain, close to water supplies, not in marshy ground or land liable to flooding, in healthy locations, not overlooked by higher ground, and not close to forests, gullies or valleys. In the case of the Klisina camps, a driving principle in site selection would have been the need to

avoid marshy ground or land liable to flooding. Essentially, this precludes the location of a camp in the River Terrace Land System, where the land is prone to flooding and is marshy. Klisina is located in the Fan Srem Land System, just north of the boundary of the River Terrace Land System. Fresh water would be available from wells, as the local water table is high, as indicated by the water level in the moat. The site is near to, but not directly on, the main line of the *via militaris*, which is 1,080 metres to the south of the moated area. As such, it is within a comfortable distance of the city of Sirmium, for the procurement of supplies, but not so close that the troops were over-exposed to city life. It is also not close to rural farmhouse complexes, with the closest being Rakić Farm to the south-west and Mandjeloska Pustara-West to the north, and as the area is a flat plain, it has no nearby points that overlook it or provide places for enemies to hide. The camps all face



Fig. 11. Position of Klisina in relation to Land Systems and surrounding rural farmhouse complexes

Сл. 11. Позиција Клисине у односу на геоморфолошке целине и античке руралне комплексе („виле“) у непосредном окружењу

MEASUREMENTS OF THE LINEAR FEATURES										
No.	Label	Type of visible object	Type of visible mark	Visible shape	Orientation	Declination from North	Westerly length of visible feature	Easterly length of visible feature	Width of visible feature	Type of feature
1	A	Linear feature	Cropmark	Potential rectangle/NW corner	N – S	0°	109 m	N/A	21 m	Potential enclosure
2	B	Linear feature	Cropmark	Potential rectangle/NW corner	N – S	0.5°	106 m	N/A	80 m	Potential enclosure
3	C	Linear feature	Cropmark	Potential rectangle/NW corner	N – S	0.4°	91 m	N/A	35 m	Potential enclosure
4	D	Linear feature	Cropmark	Potential rectangle/NW, NE corners	N – S	0.1°	106 m	39 m	120 m	Potential enclosure
5	a	Linear feature	Cropmark	Line	N – S	1°	44 m	N/A	N/A	Lateral limit
6	b	Linear feature	Cropmark	Line	N – S	0.5°	44 m	N/A	N/A	Lateral limit
7	E	Linear feature	Cropmark	Potential rectangle/NW corner	NW – SE	356°	30 m	N/A	9 m	Potential enclosure
8	c	Linear feature	Cropmark	Line	N – S	0°	28 m	N/A	N/A	Lateral limit
9	F	Linear feature	Cropmark	Potential rectangle/NW, NE corners	NE – SW	7°	140 m	71 m	99 m	Potential enclosure
9	G	Linear feature	Cropmark	Potential rectangle/NW, NE corners	NW – SE	352°	62 m	105 m	94 m	Potential enclosure
10	d	Linear feature	Cropmark	Line	NE – SW	4°	37 m	N/A	N/A	Lateral limit
11	H	Linear feature	Cropmark	Potential rectangle/NW corner	NE – SW	6°	27 m	N/A	60 m	Potential enclosure
12	I	Linear feature	Cropmark	Potential rectangle/NW, NE corners	NE – SW	7°	18 m	3 m	50 m	Potential enclosure
13	J	Linear feature	Cropmark	Potential rectangle/NE corner	NW – SE	351°	N/A	69 m	10 m	Potential enclosure
14	K	Linear feature	Cropmark	Potential rectangle/NE corner	NW – SE	351°	N/A	29 m	80 m	Potential enclosure
15	e	Linear feature	Cropmark	Line	W – E	90°	50 m	N/A	N/A	Limit
16	f	Linear feature	Cropmark	Line	W – E	89°	18 m	N/A	N/A	Limit
17	L	Linear feature	Cropmark	Potential rectangle/NW, NE corners	NW – SE	350°	12 m	22 m	90 m	Potential enclosure
18	M	Linear feature	Cropmark	Potential rectangle/NW, NE corners	N – S	359°	78 m	12 m	64 m	Potential enclosure

Note. The features are numbered looking from west to east. Declination from North tolerance is less than half of a degree. Lengths and widths measurement tolerance is less than one metre.

Table 2. The dimensions of the linear features identified at Klisina

Табела 2. Димензије линеарних њрајова ѡрејознајих на Клисина

Linear Feature Number	Width of camp on its northern side	Presumed length of camp based on 2:3 ratio of width : length	Presumed area of camp	Estimated Number of Nominal Cohorts
D	120 m	180 m	21,600 m ² or 2.16 ha.	5.4 cohorts
F	99 m	148.5 m	14,702 m ² or 1.470 ha	3.7 cohorts
G	94 m	141 m	13,254 m ² or 1.325 ha	3.3 cohorts
I	60 m	90 m	5,400 m ² or 0.54 ha	1.4 cohorts
L	90 m	135 m	12,150 m ² or 1.215 ha	3 cohorts
M	64 m	96 m	6,144 m ² or 0.614 ha	1.5 cohorts

Table 3. Calculated areas of six camps at Klisina with estimated number of nominal cohorts

Табела 3. Израчунајте ѡвјршине шесћ војних ѡјора (камјова) на Клисина са ѡроцеом броја кохортј

eastwards with their shorter side in a northern direction. This is likely the direction of their march to reach the Danube north and east of Mt. Fruška Gora. There was a permanent fortress called Castrum Caput Bassianensis or Caput Bassianense at Ševin Breg, at the site known as Dobrinačka Gradina or Solnok, near the village of Dobrinici, 3 km west of Bassianae. At this fortress, units of the *Legio II Adiutrix* were stationed from the 1st century CE until the 4th century CE.²⁸³ Evidence was found of the ancient road referred to by Jung, during an extensive search in the environs of Klisina. The issue of the relationship between the camps at Klisina and the Solnok fortress together with the military road system connecting them will be presented in a separate study.

The dimensions of the linear features are indicated in Table 2.

Those linear features show no rounded corners for the likely camps. There are also no indications of gates. Of the linear features identified at Klisina, six have two corners of the rectangle present. These pro-

vide an opportunity to calculate the area of these six camps, on the assumption that each camp conformed to the imperial standard from Pseudo-Hyginus of 2:3 and that the northern side is the shorter side of the camp. In addition, Richardson's model has been used to obtain a reasonable estimate of the nominal cohorts (being 480 infantry or 240 cavalry) in camps whose area is in hectares; this is achieved by dividing the area by 0.397.

It should be noted that the camps whose area could be calculated fall into two broad groupings, the first a group of very small camps of just over one half a hectare, housing 1–2 cohorts, with the second a group of somewhat larger camps from 1.2 to 2.1 ha, housing 3–5 cohorts. At their largest, these camps could have accommodated less than half a legion of 6

²⁸³ Crnobrnja 2020, 205–207; Milin 2004, 258–260; Petrović 1995, 222.

Klisina: ROMAN BRICK/TILE FRAGMENTS numbers and weight																									
Square number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Grid 1	No.	214	633	-	-	-	-	414	263	149*	-	-	-	179	262	101*	-	-	295	270	201	-	-	-	-
	kg	31.49	61.64	-	-	-	-	54.71	58.8	23.2*	-	-	-	121.8	69.23	13.84*	-	-	92.93	44.6	36.98	-	-	-	-
Grid 2	No.	-	-	16*	-	-	-	66*	78	-	-	104*	129*	122	-	-	107	249	118	-	-	-	-	-	-
	kg	-	-	3.86*	-	-	-	8.52*	13.65	-	-	18.15*	15.8*	25.01	-	-	12.88	40.4	34.78	-	-	-	-	-	-
Grid 3	No.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	131*	272	156	-	-	770*	570
	kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.38*	26.13	26.2	-	-	71.36*	78.25

Note. Partially surveyed squares due to vegetation in the moat zone are marked with star symbol (*). Dash (-) stands for squares which were not surveyed.

Table 4. Quantities and Weights of surface finds from Klisina

Табела 4. Количине и маса површинских налаза на Клисини

notional cohorts. These force sizes are quite small and are not indicative of the force levels required for major campaigns. This suggests that the Klisina camps were not used as assembling camps for imperial military campaigns and that the additional units required for such campaigns were housed elsewhere, presumably in the *limes* forts. Given the small size of the forces involved, it appears that the Klisina camps accommodated only an imperial guard to accompany the emperor when he was in Sirmium.

Analysis of the surface collections in the squares of the grids surrounding the moated area provide some additional insights. The results for Roman brick and tile fragments (number of pieces and weight per square) and Roman pottery (number of pieces per square) are shown in Table 4. The quantities of Roman building material (brick and tile fragments) are shown in Figures 13, 14 and 15, with quadrant (square) and kernel densities of the surface finds indicating areas of variations in their spatial distribution and concentration.²⁸⁴ A more detailed statistical analysis of these grids and squares will be included in the final reports of the Glac Survey.

The surface collections were restricted because in both the 2023 and 2024 surveys, the area on the north-western side of the farm track, indicated in Figures 5–7, was sown with wheat that had sprouted, while the remaining areas were bare ploughed soil, awaiting planting with maize. To avoid disturbance of the farm crops and because the sprouting wheat reduced surface visibility significantly, the areas planted with wheat were not subject to surface collection. This resulted in a large part of the area in which the camps were present not being the subject of surface collection. Furthermore, the mound around the moat was heavily vegetated and because of the lack of surface visibility was not subject to surface collection in some

squares. However, the grid and square data collected provided some clear trends (Figures 13, 14, 15). These were as follows:

- There are three nodes of concentration of Roman brick and tiles, one to the northwest within suggested camps H and I, and the north-western corner of D, one to the north not related to any identified linear rectangles, and one to the south-east, joining the gate to the moated area. As the node to the south-east abuts the mound around the moated area, it appears connected with structures relating to the moated area.
- The nodes to the north-west and north are separated from the moated area, and if those nodes related to the moated area, it would be expected that the operation of ploughing drag would move material away from the moated area in decreasing numbers and volumes, but this is not the case. This is particularly noticeable in the total weight of brick and tile fragments found in the squares surveyed.
- In the north-western area and northern areas, there was a significant increase in the numbers and, particularly, the weight of Roman brick and tile fragments in squares further away from the moated area in those areas where the camps were located clearly in the north-west and, probably, in the north.

²⁸⁴ The density calculations provided for the quadrant (square) densities for both total numbers and weight differ from the pattern depicted by the kernel densities. The quadrant (square) densities provide the actual data for each square, while the kernel density extrapolates the data from the centre of each square across the space to adjoining squares to provide a smoothed estimation, even when that intervening space was not surveyed. This explains the density estimation across the mounded area and moat. Nonetheless, the kernel density provides a useful tool for depicting the overall schematic and simplified pattern of the distribution of material, while the quadrant (square) densities provide more precise and detailed information.

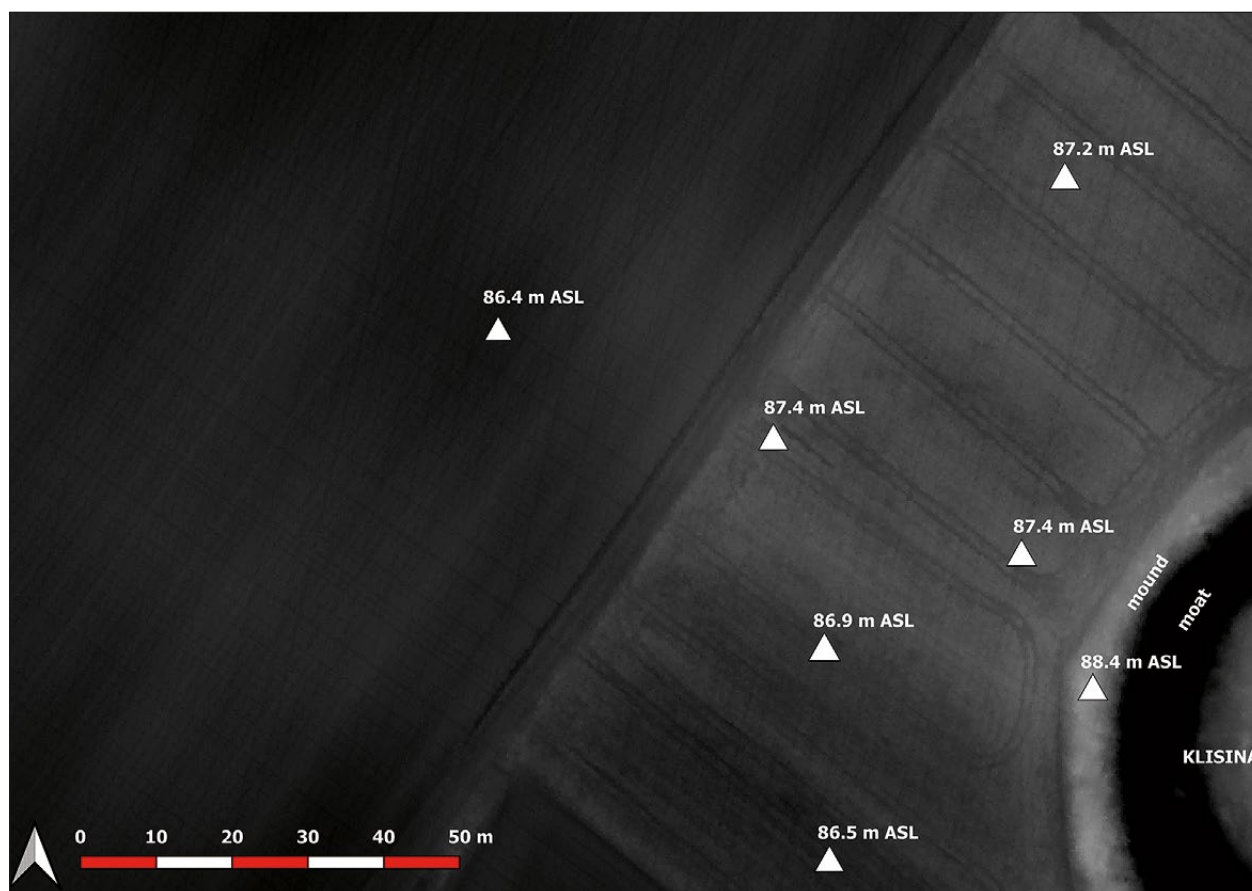


Fig. 12. LiDAR scan of the area north-west and west of the mound at Klisina showing relative and absolute height of the terrain

Сл. 12. LiDAR снимак зоне северозајадно и зајадно од насипа локалитетa Клисина са приказом релативне и ајсолућне висине терена

– This trend indicates that the source of the brick and tile fragments north-west and north of the moated areas was not the moated area but structures within the camps.

– The distribution of Roman pottery fragments shows no clear pattern in the areas covered by the camps.

This indicates that some of the camps contained structures containing Roman brick and tiles; hence, the camps were not just tented ones but had brick and tile structures and perhaps also ones of timber. Thus, these camps were not temporary campaign overnight or short-term encampments, but rather long-term camps and, perhaps, winter encampments. The presence of Roman brick and tile indicates the camps at Klisina were not practice camps, a conclusion also clear from the literary works. In support of this argument are differences in the relative heights of the ter-

rain at Klisina. Excluding the mound around the moat, which is between one and two metres higher in comparison to the surrounding fields, reaching 88.5 m ASL in the northern part, the highest area in the fields is north-west of the mound. This elevated area is the one with the largest quantities of the surface Roman building materials and where there is the dense overlap of identified lines of the camps, with two smaller enclosures tagged as H and I being encircled by larger enclosures (the survey squares 8, 9, 13 and 14 of Grid 1). Both the Basic State Map, 1:5000 in scale, and the LiDAR scan of the area from 2020 show the terrain rise up to 1 m above the area further north-west, west, and south, reaching 87.4 m ASL, shown here in Figure 12. Such circumstances in the terrain suggest that this area is where the *principia* is likely to have been located (Figures 14, 15).

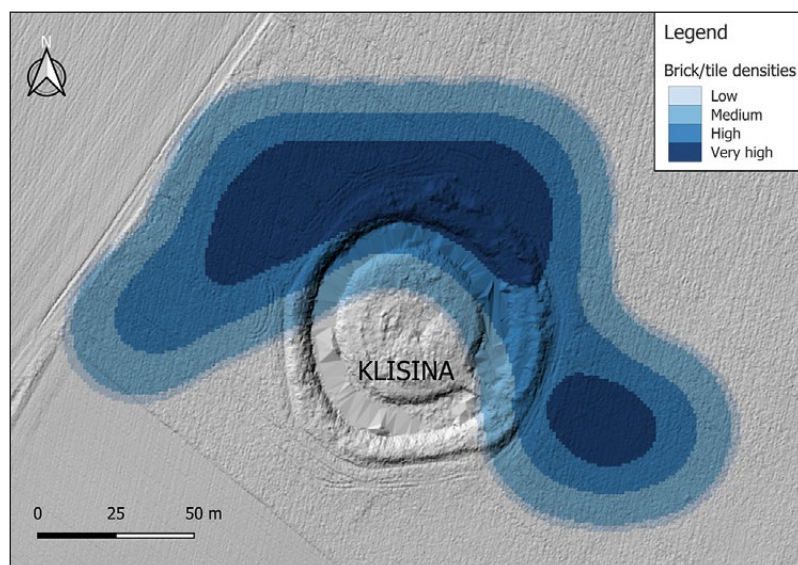


Fig. 13. Kernel Density Estimation of the Roman Brick and Tile Fragments at Klisina and its surrounding

Сл. 13. Гусѝина налаза фразиѝенаѝа римске оѝеке на Клисѝни и у ѝеѝосрдноѝ близиѝи локалиѝеѝа уѝврђена Кернел меѝодом (осѝилаѝије ѝусѝине језѝра на ѝовршини одређеноѝ скуѝом ѝачака)

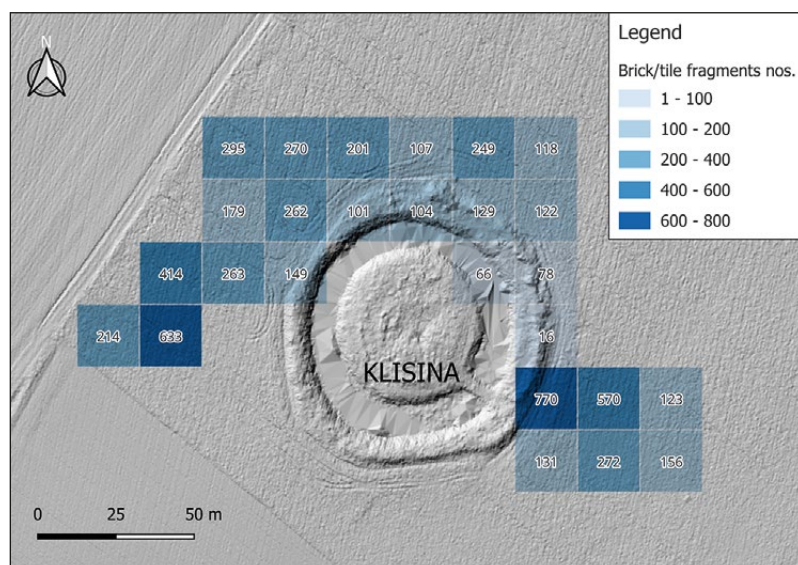


Fig. 14. Quadrant (Square) Density of the numbers of the Roman Brick and Tile Fragments at Klisina and its surrounding

Сл. 14. Гусѝина фразиѝенаѝа римске оѝеке на Клисѝни и у ѝеѝосрдноѝ близиѝи локалиѝеѝа ѝрема ѝѝиховом броју, уѝврђена бројем и расѝоредом ѝачака у јединичном ѝољу (квадранѝу)

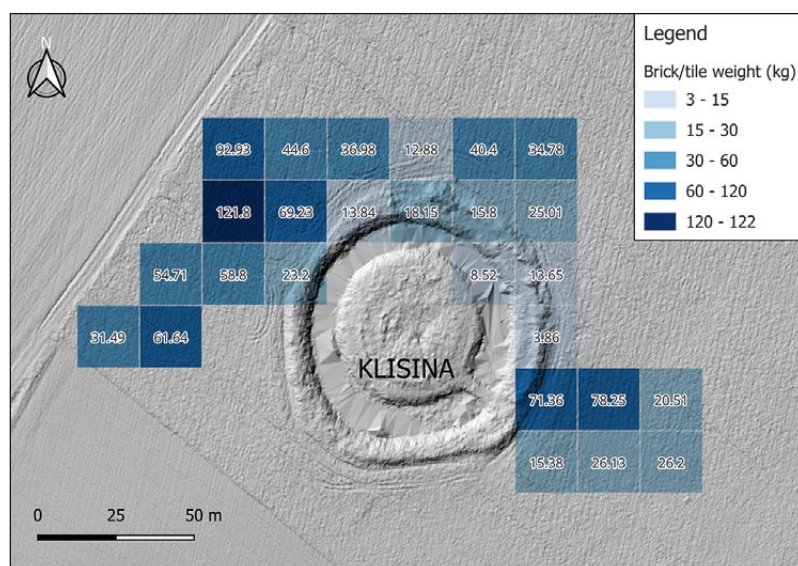


Fig. 15. Quadrant (Square) Density of the weight of the Roman Brick and Tile Fragments at Klisina

Сл. 15. Гусѝина фразиѝенаѝа римске оѝеке на Клисѝни и у ѝеѝосрдноѝ близиѝи локалиѝеѝа ѝрема ѝѝиховоѝ маси, уѝврђена бројем и расѝоредом ѝачака у јединичном ѝољу (квадранѝу)

Land Tenure of the Klisina Area in the Roman Period

When the Roman army was on campaign in enemy territory or in Barbaricum, there was no necessity to seek the consent of the owner or occupier of the land to build a camp. However, it was a different position for land within the empire. For the camps at Klisina, the area had long been within the boundaries of the empire and this raises the question of who owned the land on which the Roman military camps were built and how permission to construct these camps was obtained. The actual tenure status of agricultural lands in Pannonia Inferior is unclear. With the Roman conquest of Pannonia under Augustus, it was designated an Imperial Province and, as a result, its territory was imperially owned property.²⁸⁵ However, despite a reference in the *Epitome de Caesaribus* attributed to Aurelius Victor suggesting that Pannonian communities paid tribute, Harmatta considers they were *civitates stipendiariae* (the lowest grade of self-governing communities of natives (*peregrini*)) and paid indirect tax rather than direct tribute.²⁸⁶ Harmatta concludes that this reference to tribute did not alter the legal position that the lands in Pannonia were imperial property and the only way local communities had property rights was as *ager vectigalis*,²⁸⁷ with the land still belonging to the State but leased by the *colonia* or *municipia* to occupiers.²⁸⁸ In these circumstances, imperial estates could co-exist with estates leased to others.

The alternative theory on land tenure in Pannonia is that the territory could have been army land, *territorium legionis* / *pratum legionis*, a view supported by Rostovtzeff.²⁸⁹

Similarly, Salway considered that significant amounts of land in the British frontier region must have been military territories, outside of the control of any *civitas* or imperial estate.²⁹⁰ Mason has reviewed the inscriptional evidence pointing to the existence of *prata legionis*, which, after the middle of the 2nd century CE, was referred to as *territorium legionis*, including Burnum (Šuplja Crkva) in Croatia, the military camp of Legio XI Claudia Pia Fidelis, suggesting the area was used for pasture as opposed to cultivation.²⁹¹ Without inscriptional evidence, identifying the size of military territories is problematic, including by using the distribution of stamped legionary tiles. While there is a strong likelihood that military territories existed along the Danube, there is no evidence supporting their existence along the Sava.

The tenure issue raises questions regarding on whose land the temporary campaign camps were built. If the land near Klisina was not part of military lands, it is unlikely it was part of privately operated farms, because of potential conflicts with land used for cropping. It is more likely that it was part of an imperial estate where cropping could be limited and the area used for grazing when not required for a military camp.²⁹²

As previously indicated, the Land System analysis of the Glac Study Area indicates that the Klisina area is on the southern edge of the Fan Srem Land System, near the boundary of the River Terrace Land System. The evidence from the Glac Survey indicates that the lands east of Sirmium in the Fan Srem Land System were intensively occupied by rural farmhouses. Figure 11 shows the land systems in the area around Klisina and the location of rural farmhouse complexes.

However, the evidence for the existence of imperial estates near Sirmium is largely circumstantial. Kovács notes that many 3rd century CE emperors were born in Pannonia and in, or near, Sirmium and, hence, there is a strong likelihood that imperial estates were there too. He concludes: “*They* (i.e., emperors) *must have had not yet identified estates, villas near their hometown too.*”²⁹³

Consequently, the most that can be said is that the land at Klisina on which the military camps were built is likely to have been part of an imperial estate or, otherwise, not part of a privately held farmstead. Also, it was sufficiently distant from nearby farmsteads to be a suitable location for military camps.

²⁸⁵ Harmatta 1972, 124.

²⁸⁶ *Epitome de Caesaribus* 1.7; Harmatta 1972, 124.

²⁸⁷ Justinian Digest D.2.8.15.1 provides: “One who possesses *ager vectigalis*, that is, holds land under a contract of *emphyteusis* (long-term lease), is understood to be [the] possessor.”

²⁸⁸ Harmatta 1972, 125–126.

²⁸⁹ Harmatta 1972, 127; Rostovtzeff 1957, 244–246.

²⁹⁰ Salway 1965, 189.

²⁹¹ Mason 1986, 20–21; Mason 1988, 146.

²⁹² Dimitrijević, Whitehouse 2022a.

²⁹³ Kovács 2023, 448. Kovács’ paper contains errors. He identifies Jarak as the road station Fossae at 441–442 and cites Dimitrijević and Whitehouse 2021 as authority, when that paper concludes the exact opposite. Similarly, Kovács refers to the palace at Glac as being on the road from Sirmium to Fossae at 443, which it is not, but rather it is on the vicinal road from Sirmium to the Canal of Probus, as indicated in Dimitrijević and Whitehouse 2022b.

The Emperor on Campaign with the Army

The texts of ancient authors referred to previously indicate that on many occasions, emperors were personally involved with campaigns undertaken by the army occupying the camps at Klisina. These emperors were Marcus Aurelius, Commodus, Maximinus Thrax, Gallienus, Probus, Constantius II and Julian. When the emperor was leading an army encamped at Klisina, it is unlikely the emperor was actually residing at the camp, but more likely residing in the imperial palace in Sirmium itself or, in the case of Constantius II, at Glac Palace. The relationship between the emperor and the army evolved during the imperial period. Until 235 CE, the army was content to be led by emperors from the senatorial elite, irrespective of their military skills. Following the accession of Maximinus Thrax, most emperors were career soldiers and were perceived by the army as fellow soldiers (*commilitio*), living the life of a soldier. Following the victory of Constantine, the principle of dynastic succession was revived, but there was a continuing need for emperors to establish military legitimacy.²⁹⁴

The role of the emperor in such circumstances was a symbolic one of actively embracing the role of *imperator* through a vigorous personal presence on campaign, with speeches to troops, parades and staged interactions with the troop to boost morale with expressions of support and empathy with their travails.²⁹⁵ Hence, the many references in sources to the emperor as a *commilitio* are akin to the photo opportunities of current day politicians. Herodian records that Septimus Severus used a cheap tent and ate and drank only what was available for everyone.²⁹⁶ Caracalla marched on foot, neither bathing nor changing his clothes and occasionally carried out the menial duties of soldiers, using wooden utensils, eating local bread and sometimes baking his own.²⁹⁷ The *Historia Augusta* records that Hadrian shared the basic military diet of bacon, cheese and vinegar, which he consumed in the open to ensure he was seen by the troops.²⁹⁸ Of key importance were speeches by the emperor on campaign to the army (*adlocutio*).²⁹⁹ The role of the emperor was symbolic and vital to the army's morale and spirit. Eaton writes: "*The ideal relationship between the emperor and his soldiers consisted of an army emotionally united in staunch support for a capable ruler.*"³⁰⁰

Thus, it is unlikely the emperors slept at the camps at Klisina, but their regular presence at the camps for

speeches, reviews and the ancient equivalent of photo opportunities was critical to the maintenance of their legitimacy and the morale of troops.

Conclusion

The Glac Survey has identified the location of temporary military camps near Sirmium. These camps are referred to in numerous ancient textual sources, but their location had not, until now, been identified. These camps are at Klisina, 6.5 kilometres north-east of Sirmium. The location of the camps was undertaken by remote means through the identification of a series of crop marks and the areas were then subjected to a detailed surface survey, including the positioning of grids and squares where all surface artefacts were collected, counted and weighed.

There appears to be at a minimum of 11 identifiable temporary Roman military camps, based on linear features with one or more than one right-angled corner. There are an additional two features with one or more than one right-angle corner, which could either be additional separate temporary Roman military camps, bringing the total to 13 camps, or they could be internal features within a temporary Roman military camp. Multiple temporary Roman camps in the same location are rare, but are found at other locations such as Brigetio, modern Komárom-Szöny, in Hungary and on the opposing left bank of the Danube at Iža-Leányvár in Slovakia, where the same location was used over time, as was the case at Klisina.

An unusual feature of the Klisina camps is the supporting literary and inscriptional evidence, which indicates the time frame for the camps.

The comparative study of Roman military camps undertaken has proposed a revised classification of these temporary military camps in the light of a broader data set than that from British camps, which were the foundation of earlier classifications.

An analysis of the size of these camps point to their role as providing accommodation for only a small force of troops. The camps fall into two broad

²⁹⁴ Hebblewhite 2017, 8–22, 26.

²⁹⁵ Campbell 1984, 18.

²⁹⁶ Herodian, Histories 2.11.2; 3.6.10.

²⁹⁷ Herodian, Histories 4.7.4–7; 12.2.

²⁹⁸ Historia Augusta, Hadrian 10.

²⁹⁹ Campbell 1984, 71–76.

³⁰⁰ Easton 2020, 104.

size classes; with one group of just over one half a hectare, housing 1–2 cohorts; and a second a group of larger camps from 1.2 to 2.1 ha, housing 3–5 cohorts. At their largest, these camps could have accommodated less than half a legion of 6 notional cohorts. These force sizes are quite small and are not indicative of the force levels required for major campaigns. This suggests that the Klisina camps were not used as assembling camps for imperial military campaigns and that the additional units required for such campaigns were housed elsewhere, presumably in the *limes* forts. Given the small size of the forces involved, it appears that the Klisina camps accommodated only an imperial guard to accompany the emperor when he was in Sirmium.

An examination of the surface finds indicates that the source of the Roman brick and tile fragments north-west of the moated areas was not the moated area but structures within the camps. This indicates that some of the camps contained structures containing Roman brick and tiles; hence the camps were not just tented ones, but had brick and tile structures and perhaps also ones of timber. Thus, these camps were not temporary overnight campaign and short-term en-

campments, but rather long-term camps and perhaps winter encampments.

Acknowledgements

We would like to thank the following graduate and postgraduate volunteers who participated in the field survey in February and March 2023 and February and March 2024 for their dedication and professionalism.

In 2023 these were Mihajlo Džamtovski, Stefan Gajić, Stefan Novaković, Ivana Protić, Aleksandar Stamenković, Jovan Stipić, Uroš Svirčević, and Bojan Tajhmeister.

In 2024 these were Jana Bogdanović, Anastasija Đurđević, Stefan Gajić, Maja Jekić, Stefan Novaković, Ivana Protić, Simeun Srdanović, Aleksandar Stamenković, Matija Šušel, Uroš Svirčević, and Bojan Tajhmeister.

This paper would not have been possible without their valued contribution.

The Quadrant (Square) Density and Kernel Density analysis was undertaken by Dr Marko Milošević from the Geographical Institute “Jovan Cvijić” of the Serbian Academy of Sciences and Arts in Belgrade. The assistance of Dr Jelena Čalić and the Geographical Institute is gratefully acknowledged.

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ВИШЕ РИМСКИХ ВОЈНИХ ЛОГОРА НА ЛОКАЛИТЕТУ КЛИСИНА У БЛИЗИНИ АНТИЧКОГ СИРМИЈУМА

Кључне речи. – Глац, кастра, каструм, Клисина, римски војни логори, римске фортификације, Сирмијум

У оквиру „Пројекта Глац”, који се од 2017. године одвија кроз сарадњу Археолошког института из Београда и Универзитета у Сиднеју, обављају се ископавања археолошког локалитета „Глацов салаш” код Сремске Митровице и археолошка рекогносцирања на деловима територија Срема и Мачве укупне површине 700 km². Циљеви археолошких рекогносцирања су: 1) препознавање образаца насељавања током античке прошлости на ширем подручју око античког Сирмијума; 2) интерпретација услова животне средине овог подручја у далекој прошлости; 3) утврђивање социоекономских активности у прошлости са фокусом на руралну економију; 4) идентификација античких структура у непосредној околини „Глацовог салаша”, насеобина, некропола, путева и сл.

Као део археолошких рекогносцирања предузето је истраживање локалитета Клисина, североисточно од Сремске Митровице, на потесу Цреповац–Ливаде. Смештен на ораницама испресецаним каналима, локалитет чине издигнута кружна површина пречника око 50 м зарасла у густу вегетацију, која је окружена јарком испуњеним водом и кружним насипом, око ког се даље простиру обрадиве површине. Укупна површина локалитета заједно са ораницама на којима се налази концентрација културног материјала износи 15 ха.

У археолошкој литератури локалитет је описан као место на ком се вероватно налазе остаци античког утврђења, где се уз римску материјалну културу налазе такође предмети из млађег гвозденог доба и из средњег века.

Током истраживања идентификовано је најмање два наест античких писаних извора који директно или индиректно указују на постојање привремених војних кампова римске војске на периферији Сирмијума. Међу тим ауторима најзначајнији су Херодијан и Амијан Марцелин. Поставља се истраживачко питање да ли се остаци војних кампова налазе на локалитету Клисина и у његовој непосредној околини.

У оквиру пројекта рекогносцирања у марту 2020. године подручје источно од Сремске Митровице снимљено је методама даљинске детекције (*LiDAR* и аерофотографија). Такође, прикупљени су јавно доступни сателитски снимци подручја. Током теренских кампања 2023. и 2024. године, локалитет Клисина и његова непосредна околина су детаљно прегледани. Прикупљени површински налази су систематизовани, квантификовани и геореференцирани према просторним контекстима налазаска (квадратне мреже).

На сателитским снимцима локалитета препознати су фитоолошки трагови и трагови на површини земље у виду ли-

нија, који указују на постојање структура испод површине земље југозападно, западно, северозападно, северно и источно од кружног насипа Клисине. Утврђено је да се препознати линијски трагови просторно преклапају са местима веће релативне висине и са зонама концентрације површинског културног материјала, који углавном чине фрагменти античке опеке и грнчарије. Препознати обриси структура, њихови облици, пропорције и величина анализирани су у контексту планиметрије римских војних логора и њихове функције. За потребе анализе коришћени су антички писани извори о војним логорима (Полибије, Онасандар, Псеудо-Хигин, Вегеције) и аналогije из модерне археолошке литературе (Аустрија, Британија, Мађарска, Румунија, Србија, Чешка). Размотрени су потребни капацитети за смештај римских војних јединица у прошлости и употреба различитих формација према величини војних логора. Могућ смештај римских војних јединица на Клисини сагледан је из угла геоморфологије и археолошке топографије њене околине. Коришћење овог места у прошлости размотрено је у историјским контекстима боравка појединих императора у Сирмијуму у чијој пратњи је била римска војска.

У раду се закључује да се на Клисини могу препознати трагови најмање једанаест привремених војних логора римске војске, уз трагове још две структуре које представљају објекте унутар тих кампова или посебне кампове, што њихов број повећава на најмање тринаест. Трагови се углавном пресецају на истом месту или се додирују, што је у складу са подацима античких писаних извора који указују на сукцесивно коришћење привремених војних логора код Сирмијума у периоду од 2. до краја 4. века. Њихове величине (од пола хектара до преко два хектара) одговарају смештају мањих војних јединица, од једне или две кохорте, па до формација величине три до пет кохорте. Анализа врсте и дистрибуције остатака грађевинског материјала, указује да су римски војни логори на Клисини поред привремених структура и смештајних капацитета за трупе (дрвени објекти и шатори) укључивали такође и зидане објекте. На основу величине логора и присуства зиданих структура закључено је да нису служили за прикупљање јединица у сврху покретања ратних кампања, нити за краткотрајан смештај трупа током маршева. У раду се закључује да су привремени војни логори на Клисини служили за сезонске боравке римске војске (најчешће током зиме), односно за смештај формација у пратњи императора за време њиховог боравка у Сирмијуму, што потврђују и подаци из античких писаних извора.

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LEAD OBJECT IN THE SHAPE OF AN AMPHORA WITH AN INSCRIPTION FROM *NAISSUS*

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Abstract. – During the systematic excavation of the presumed medieval Church of St Panteleimon in the eastern part of Niš (*Naissus*), a lead object in the form of a hollow cast amphora was discovered in a so-called “ceramic pit”. The object featured floral decorations and a two-line Greek inscription, which can be read as: ΕΙΡΩΝΟΧ/ΡΙΝ. Miniature lead amphorae constitute a notable category of small finds of the Late Roman Republican and Imperial periods and Late Antiquity. These miniature vessels were not intended for everyday use but served as containers for medicines, ointments, or other liquids. Comparable objects and moulds have primarily been found in the Eastern Mediterranean, although the majority are held in museum collections without secure archaeological provenance. Some lead containers bear a Greek name in the genitive case, most likely indicating the pharmacist (or physician) responsible for preparing the contents. In one confirmed instance, an inscription identified the amphora as containing a remedy for eye diseases; the specimen from Naissus was likely used for the treatment of nasal ailments. On morphological and linguistic grounds, the Naissus find can be dated to the Roman Imperial period (2nd–3rd century), and no later than the late 3rd century CE. In this contribution, we aim to offer a more comprehensive analysis of the Naissus vessel’s inscription, which would help to date this object more precisely. Additionally, we intend to provide a review of related ancient literary sources and archaeological materials to gain better insight into their purpose in the Roman period and Late Antiquity.

Keywords. – Niš–*Naissus*, miniature lead amphora, imported material, Greek inscription, ancient medicine, ancient pharmacology, nasal diseases, ancient cosmetics, Roman Imperial period

During systematic archaeological investigations conducted in 1966 and 1969 by the Department of Art History of the Faculty of Philosophy in Belgrade and the National Museum in Niš,¹ a fragmented lead object was discovered in the courtyard of the present-day Church of St Panteleimon,² at the presumed site of a Nemanjić-era church (Fig. 1). The object was not assigned a specific function at the time of discovery.³

This lead find has since been examined in two publications, primarily from palaeographic and iconographic perspectives.⁴ However, based on a closer analysis of the inscription and parallels with similar miniature lead vessels published in the scholarly literature and online museum catalogues, we are now able

to propose a more precise interpretation of the object. In doing so, we also offer certain corrections to the

¹ The authors would like to express their gratitude to Dr Anastasios Antonaras for the valuable suggestions regarding the reading of the Greek inscription, as well as the anonymous reviewers for pointing out the new findings of miniature lead amphorae. All errors in the interpretations remain the responsibility of the authors.

² The field team from the Faculty of Philosophy in Belgrade during the first campaign in 1966 consisted of Dr V. Korać and N. Dudić. In the 1969 campaign, the team included Dr Vojislav Korać, Marica Šuput, Dragan Todorović, and Vesna Todorović, while Bojana Deljanin and Radmila Ajdić from the National Museum in Niš participated in both campaigns. Cf. Kopah 2000; idem 2002, 103.

³ Kopah 2002, 132, T. IX/149.

⁴ Јовановић 2003, 43–49; Ракоција 2008, 49–50.



Fig. 1. Eastern part of the city of Naissus:

1. The position of the find of the miniature lead amphora; 2. Roman city on the place of the Turkish fortress; 3. Necropolis of Naissus in Jagodin Mala (after: GeoSrbija.rs)

Сл. 1. Источни гео Науса:

*1. Положај налаза минијатурне оловне амфоре;
2. Римски град на месту турске тврђаве;
3. Некропола Науса у Јагодин Мали
(према: GeoSrbija.rs)*

epigraphic content of comparable specimens, most of which originate from the Eastern Mediterranean.

Description of the object

The object is a lead vessel cast in a two-part mould (Figs. 2/a–b, 3a). At the time of discovery, it exhibited damage to the rim and handles, as well as surface scratches on the upper part of the body. An excess of lead is visible on one side of the vessel, likely resulting from overflow during the casting process (Fig. 3b). The vessel is spindle-shaped, typologically resembling an amphora, with a widened neck and two opposing handles. One handle is damaged, while the other is deformed and fused to the neck. The body of the vessel is divided into three zones by horizontal raised bands. The upper two zones contain a Greek inscription accompanied by a depiction of a palm tree. The lowest zone is decorated with a motif consisting of horizontal parallel lines and hemispherical protrusions. The base of the vessel is button-shaped. The object measures 4.2 cm in height and 1.8 cm in width, with a weight of 18.43 g. It has a capacity of 1.7 cc, equivalent to 24 drops of

liquid. The artifact is housed in the Medieval Collection of the National Museum in Niš (inv. no. 419).

Find context

The lead amphora was discovered in squares S7 and S8, within, or just east of, the presumed apse of a Christian cult building,⁵ where the excavators identified a “ceramic pit” approximately 0.70 metres in diameter. Traces of soot were observed within its infill. The rel-

⁵ The excavations took place approximately 50 metres north-east of the present-day Church of St Panteleimon, at a location where, according to local tradition, an older sanctuary dedicated to the same saint once stood. The remains of this structure were reportedly visible until the eve of the First World War. Unfortunately, during the 19th and early 20th centuries, the building was largely dismantled, and some of its materials were repurposed in the construction of the current Church of St Panteleimon, completed in 1878. During investigations at the presumed site of the earlier church, it was observed that local residents gathered annually on July 14th to celebrate the feast of the Holy Wonderworkers and Unmercenary Physicians, Cosmas and Damian. This suggests that the churchyard may have been dedicated to these Christian healers. Cf. Kopan 2002, 106–107.



Fig. 2, a–b. Miniature lead amphora from Naissus, front and rear (photo: Željko Cajić)

Сл. 2, а–б. Минијатурна оловна амфора из Науса, предња и задња страна (фото: Жељко Цајић)

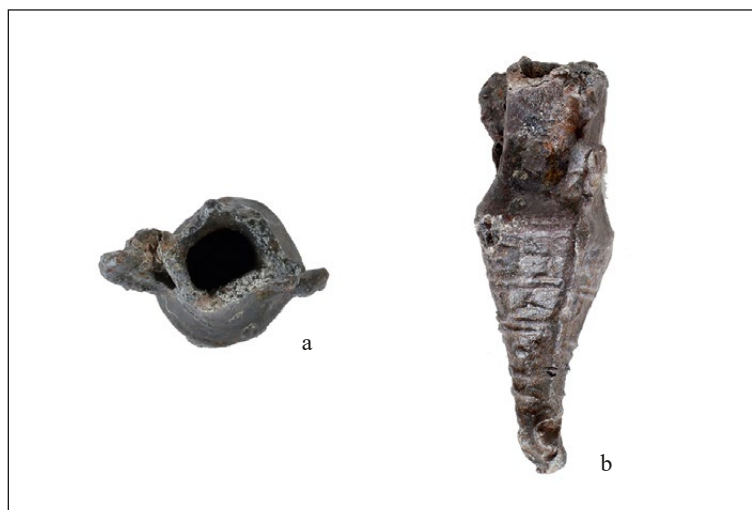


Fig. 3, a–b. Miniature lead amphora from Naissus, details of the vessel opening and lead overflowing at the mould joint (photo: Željko Cajić)

Сл. 3, а–б. Минијатурна оловна амфора из Науса, детаљи отвора посуде и изливеног олова на саставу калуђа (фото: Жељко Цајић)

atively small number of finds suggests a medieval waste deposit.⁶ Aside from the lead object, the assemblage also included several other metal items, fragments of glass vessels, and pottery sherds, datable to the Middle Ages.⁷

Excavations carried out in the 1960s revealed architectural remains, including wall fragments and mortar floors, all in a poor state of preservation. The discovery of building materials such as *tegulae*, *imbrices*, and bricks pointed to the presence of a Roman-period structure. The researchers proposed that the remains belonged to an early Christian basilica from Late Antiquity, adjacent to which, possibly reusing Roman construction materials, a medieval church was later erected.⁸ In the Middle Ages, a necropolis was established at the site, apparently following the demolition of earlier structures.⁹ Burials were conducted in accordance with Christian custom, and

based on the associated grave goods – particularly coin finds – the necropolis can be dated to the period between the 12th century and the 1260s.¹⁰

⁶ Given the diversity of the finds recovered from the feature, the designation “ceramic pit” is considered inadequate.

⁷ Among the pottery finds are a small rim fragment of a vessel made of red-fired clay; a rim fragment of a vessel made of poorly purified and insufficiently fired clay, decorated with horizontal incised lines and bearing traces of soot; and two fragments of a pottery lid made of grey-fired clay. The objects are housed in the Medieval Collection of the National Museum in Niš (inv. nos. 454, 474, and 479/1–2).

⁸ Kopañ 2002, 109–112.

⁹ During systematic archaeological investigations in the 1960s, 149 graves were uncovered (Kopañ 2002, 109). An additional 95 graves, containing 120 individuals, were discovered during rescue excavations in the first decade of the 21st century (Црноглавац, Чершков 2011).

¹⁰ Црноглавац, Чершков 2011, 134–135.

Functional analysis of the lead object

The lead object from the excavations at St Panteleimon in Niš was first published in a research report by Vojislav Korać in 2002, and later analysed in both functional and symbolic contexts in the works of Aleksandar Jovanović and Miša Rakocija. In all of these studies, the object was published solely as a schematic drawing, accompanied by minimal descriptive data.

According to Korać, the object featured incised horizontal lines with an ornament between them, possibly containing engraved letters (Fig. 4).¹¹ In a 2003 publication, Jovanović included the object among the official symbols of the city of Naissus, interpreting it as a weight from the local metrological system.¹² He identified three letters, *PIN*, on one side of the object, which he misread as Latin, suggesting the interpretation: *P(ondo) I(un)o N(aisi)*.¹³ In his reading, the upper ornamental zone contained a stylized rosette, potentially part of a ship's *rostra*, while the lower zone was decorated with a palm branch at the end of the inscription.¹⁴ He linked this palm branch to the iconography of the personification of the city, represented on a silver coin from north-western Bulgaria.¹⁵ Based on the vessel's shape, he also proposed that it featured a Pontic amphora of late antique production.

Building upon Jovanović's interpretation of the object's official character M. Rakocija further developed the thesis that the palm branch motif on this amphora-like artifact functioned as a symbol of martyrdom in Naissus, or more broadly, as a symbol of triumph over death. He supported this interpretation by drawing attention to the depiction of two palm branches above the figures on the wall of an early Christian tomb from the eastern necropolis of Naissus in Jagodin Mala, dated to the late 4th or early 5th century CE.¹⁶ Jovanović dated the lead amphora to the late 4th century, based on the presence of a fragment of a glazed pottery vessel found in the same "ceramic pit."¹⁷ However, Korać's field report does not explicitly link the vessel to that context.¹⁸

The miniature amphora-shaped vessel made in a double mould from Naissus belongs to a wider group of objects predominantly found in the Eastern Mediterranean.¹⁹ The defining feature of these items is their manufacture in moulds imitating amphorae with two handles of various types, though not necessarily replicating contemporary vessel forms. These artifacts are characterized by their hollow interiors and outer surfaces typically decorated with geometric or floral motifs. Some examples also bear inscriptions, most

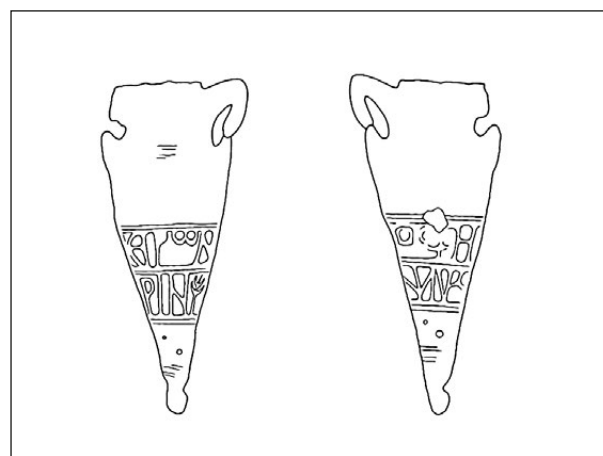


Fig. 4. Miniature lead amphora from Naissus, drawing (after: Korać 2002, T. IX, 149)

Сл. 4. Минијатурна оловна амфора из Науса, цртеж (према: Кораћ 2002, Т. IX, 149)

often in Greek. The precise nature of their closures was revealed due to a find from a closed archaeological unit in Pavlikeni, in northern Bulgaria. Namely, during the research of the late antique necropolis of this Roman city, a brick-built tomb was discovered, dated to the first half of the 3rd century. Among the tomb's inventory was a lead object of spindle shape, which had a preserved lid.²⁰ The lid was in the form of a cushion-shaped stopper with a nipple-shaped handle.

¹¹ Korać 2002, 132, cat. br. 149.

¹² Jovanović 2003, 49–50, sl. 4.

¹³ Jovanović 2003, 49.

¹⁴ It is assumed here that the lead amphora has a depiction of a palm tree, rather than a palm branch.

¹⁵ Jovanović 2003, 49, напомена 31.

¹⁶ Rakocija 2008, 49–50, sl. 1–2.

¹⁷ Jovanović 2003, 49, напомена 32.

¹⁸ Korać 2002, 142, T. XIV/124. The fragment belongs to a grey-fired vessel made of moderately purified clay, with an olive-green glaze on the exterior, datable to Late Antiquity (the 4th–5th century).

¹⁹ Rahmani 2003; Laflı, Buora 2023; 2024.

²⁰ Чакъров 2023, 30–32, obr. 3/1.

²¹ Rahmani 2003, 41, cat. 6; 56.

²² In our work, we have listed the findings published so far, as well as those from museum websites. We have not included findings from auction websites, where individual examples of this type of vessel can be found.

²³ Rahmani 2003, 39. The dating is based on the context of the find within the collapse layer of the Umayyad-era shop in Bet She'an, prior to the earthquake of 749 CE, which does not necessarily mean that the object was in use until that time.

The specimen from Naissus could have had a lid made of lead or of some organic material, which has not been preserved to this day.

The discovery of a marble mould at Delos (Table I, cat. 23; Fig. 5. 4) suggests that Delos was one of the production centres. It has also been suggested that some specimens were originally produced in Rome.²¹ However, we assume that there were several production centres of these objects. First, production depended on the availability of raw materials for their manufacture. Second, it also depended on market needs. Given that these are containers for medical, pharmaceutical, or cosmetic products, the primary customers of this packaging would have been doctors, pharmacists, or producers of perfumes and ointments. Thanks to the inscriptions on the lead amphorae, as well as to the historical sources, we can conclude that the producers of the amphora contents were “licensed”, that is, their names guaranteed the quality of the product.

From this, it follows that they gave their consent for their name to appear on such containers/packaging. Third, given that these are small objects, it is possible that the craftsmen could carry moulds with them and produce lead amphorae on the spot, for specific clients. At this stage of research, we do not know if there was any misuse of the names of famous doctors, pharmacists, or “brands,” which may have been copied in the market due to their known quality and popularity.

To date, more than 150 miniature lead amphorae have been recorded worldwide, most of them held in museums or private collections (Fig. 5).²² More than half have been published to date (Table 1). These finds are dated from the 1st century BC to a *terminus ante quem* of 749 CE.²³ The majority of the miniature amphorae are concentrated in the Eastern Mediterranean, particularly in the Levant and Anatolia, while a smaller number originates from the western part of the Roman empire (Fig. 6).

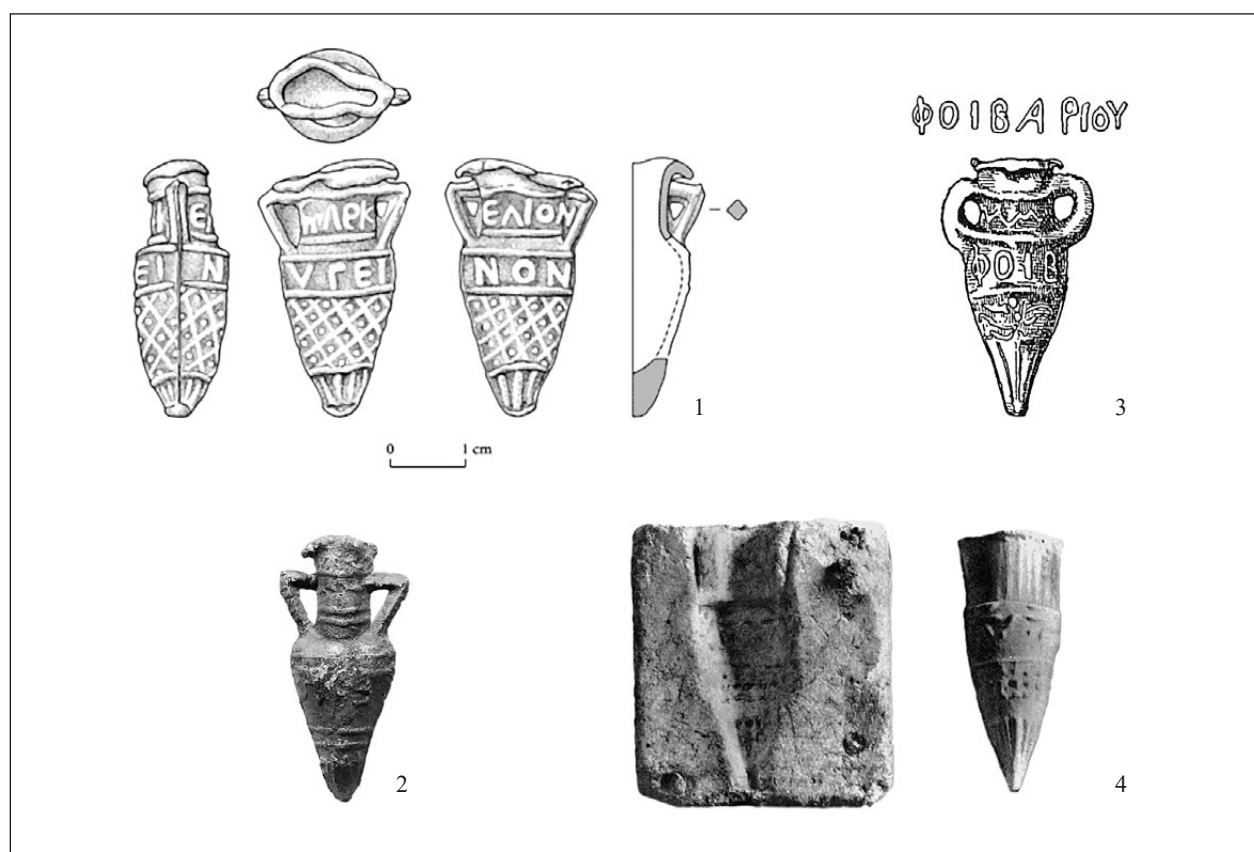


Fig. 5. Examples of miniature lead amphorae from: 1. Hebron; 2. Macedonia; 3. Berlin; 4. Mould from Delos (1, after: Farhy 2016, fig. 2; 2 and 4, after: Rahmani 2003, cat. 23 and 6; 3, after: Tarborelli 2012, 1051, fig. 6)

Сл. 5. Примери минијатурних оловних амфора: 1. Хеброн; 2. Македонија; 3. Берлин; 4. Калуп са Делоса (1, према: Farhy 2016, fig. 2; 2 и 4, према: Rahmani 2003, cat. 23 and 6; 3, према: Tarborelli 2012, 1051, fig. 6)

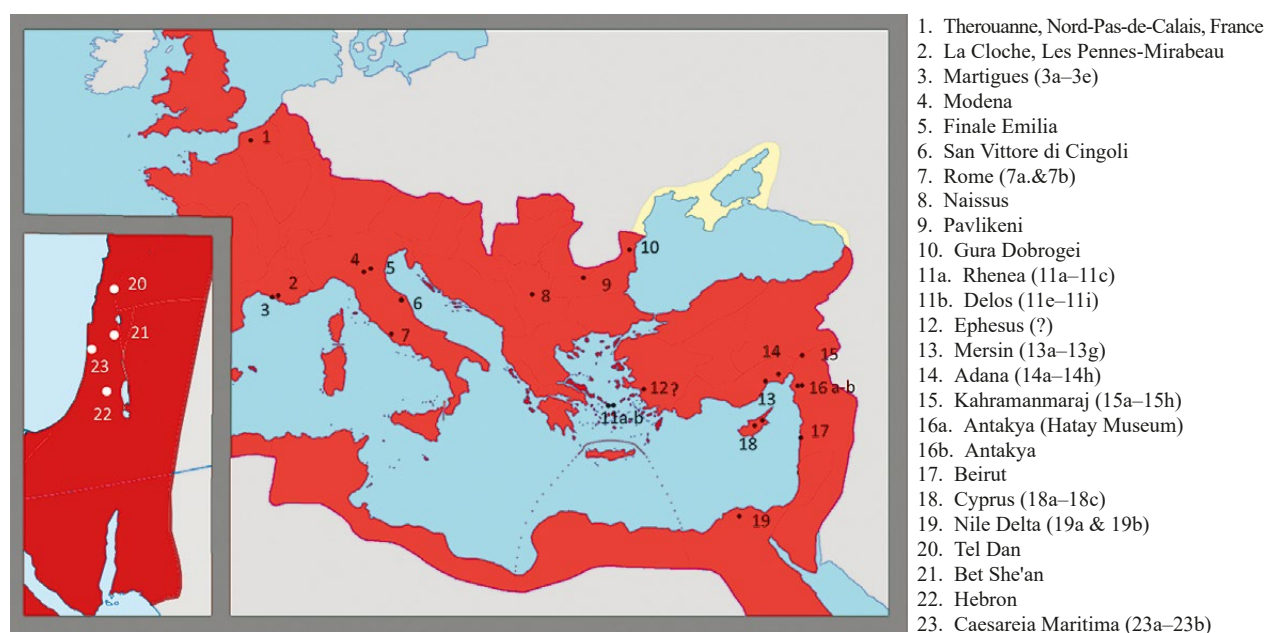


Fig. 6. Distribution map of miniature lead amphora finds (Milan Prodanović)

Сл. 6. Мапа распрострањености налаза минијатурних оловних амфора (Милан Продановић)

Table 1. List of miniature lead amphora (connected to the illustration, Fig. 6)

Табела 1. Листа минијатурних оловних амфора (веза са илустрацијом, сл. 6)

No. On the Map	CAT. No.1	Provenance	Archaeological context / Collection	Dimensions in cm	Inscription	Dating / *Note	Bibliography
1.	1.	Therouanne, Nord-Pas-de-Calais, France	Excavated in 1996 in a cremation burial, contained within a clay ash urn. This and further pottery vessels discovered there date the burial to the late 1 st – early 2 nd century CE	7.3×2.2×1.9			Rahmani 2003, cat. 1
2.	2.	La Cloche, Les Pennes-Mirabeau (Bouches -du-Rhône)	Oppidum	Height: 5.0		1 st c. BC	Marty 1999, p. 165.
3.a	3.	Martigues (Bouches-du-Rhône)	Port, research in 1978				ARN01_20101311609, Ministère de la culture FR, DRASSM
3.b	4.	Martigues (Bouches-du-Rhône)	Port, research in 1978				ARN01_20101311610, Ministère de la culture FR, DRASSM
3.c	5.	Martigues (Bouches-du-Rhône)	Port, research in 1978				ARN01_20101311611, Ministère de la culture FR, DRASSM
3.d	6.	Martigues (Bouches-du-Rhône)	Port, research in 1978				ARN01_20101311612, Ministère de la culture FR, DRASSM
3.e	7.	Martigues (Bouches-du-Rhône)	Port, research in 1978				ARN01_20101311613, Ministère de la culture FR, DRASSM
4	8.	Modena, Parco Novi Sad	Museo civico, Modena	Height: 4.9–5.0	C(aius)C(I)S.. or C(O)S	Flavian-early 2 nd c. CE	Corti 2021, cat. 1.
5	9.	Finale Emilia / Modena, loc. Motto	Museo civico, Finale Emilia (MO)	Height: 4.9			Corti 2021, cat. 2.
6	10.	San Vittore di Cingoli-Cingulum	Museo Archeologico Statale di Cingoli (MC), N. Inv. 55090.	Height: 6.6; Weight: 21.5 gr	<i>aromaticum Ambrosi atrum authemerum;</i> and similar		Marengo, Taborelli 2013, fig. 1.
7.a	11.	Rome	Unknown; Thorvaldsen Museum Copenhagen	5.3×1.6×1.6	SE/RO/C/E		Rahmani 2003, cat. 14.
7.b	12.	Rome	Unknown	Unknown	Μακεδόνιος		Rahmani 2003, cat. 14, note. 63.

No. On the Map	CAT. No.1	Provenance	Archaeological context / Collection	Dimensions in cm	Inscription	Dating / *Note	Bibliography
8.	13.	Naissus, Niš	St. Panteleimon churchyard, excavations 1966/1969, ceramic pit	Height: 4.2; Weight: 18.43 gr	ΕΙΡΩΝΟΧ/ΡΙΝ	2 nd –3 rd c. CE	Korać 2002, cat. 149.
9.	14.	Pavlikeni, Veterinary clinic	Necropolis, tomb 2	Height: 8.2 cm		3 rd c. CE / * Preserved lead vessel lid	Chakarov 2023, fig. 3.1.
10.	15.	Gura Dobrogei		Height: 5.0 cm			Custurea 2022, 357, no. 2; Laflı, Buora 2024, fig. 2, a–b.
11a.	16.	Rhenea	Found in a tomb	Unknown			Rahmani 2003, cat. 7
11b.	17.	Rhenea	Found in a tomb	Unknown			Rahmani 2003, cat. 8
11c.	18.	Rhenea	Found in a tomb	Unknown			Rahmani 2003, cat. 9
11e.	19.	Delos	Unknown	Height: 6			Rahmani 2003, cat. 2
11f.	20.	Delos	Unknown	Height: 6			Rahmani 2003, cat. 3
11g.	21.	Delos	Unknown	Height: 6			Rahmani 2003, cat. 4
11h.	22.	Delos	Unknown	Height: 7.5			Rahmani 2003, cat. 5
11i.	23.	Delos	Unknown	Unknown		*Marble mould	Rahmani 2003, cat. 6
12.	24.	Ephesus?	Unknown	Height: 4.6	ΕΦΕC		Laflı, Buora 2024, fig. 40.
13a.	26.	Archaeological Museum of Mersin	Unknown	Height: 3.6	ΦΟΙΡΒΑΡΙΟΥ		Laflı, Buora 2024, cat. 5, fig. 7.
13b.	27.	Archaeological Museum of Mersin	Unknown	Height: 5.1	ΦΟΙΡΒΑΡΙΟΥ		Laflı, Buora 2024, cat. 6, fig. 8.
13c.	28.	Archaeological Museum of Mersin	Unknown	Height: 5.5			Laflı, Buora 2023, cat. 11.
13d.	29.	Archaeological Museum of Mersin	Unknown	Height: 5.4			Laflı, Buora 2023, cat. 12.
13e.	30.	Archaeological Museum of Mersin	Unknown	Height: 5.5			Laflı, Buora 2023, cat. 13.
13f.	31.	Archaeological Museum of Mersin	Unknown	Height: 4.8			Laflı, Buora 2023, cat. 14.
13g.	32.	Archaeological Museum of Mersin	Unknown	Height: 4.9			Laflı, Buora 2023, cat. 15.
14a.	33.	Archaeological Museum of Adana	Unknown	Height: 4.3			Laflı, Buora 2024, cat. 1, fig. 1.
14b.	34.	Archaeological Museum of Adana	Unknown	Height: 4.9			Laflı, Buora 2024, cat. 2, fig. 3.
14c.	35.	Archaeological Museum of Adana	Unknown	Height: 3.9			Laflı, Buora 2024, cat. 3, fig. 4.
14d.	36.	Archaeological Museum of Adana	Unknown	Height: 5.1	ΦΟΙΡΒΑΡΙΟΥ-type		Laflı, Buora 2024, cat. 4, fig. 6.
14e.	37.	Archaeological Museum of Adana	Unknown	Height: 5.3	ΦΟΙΡΒΑΡΙΟΥ-type		Laflı, Buora 2024, cat. 7, fig. 15.
14f.	38.	Archaeological Museum of Adana	Unknown	Height: 4.1	ΦΟΙΡΒΑΡΙΟΥ-type		Laflı, Buora 2024, cat. 8, fig. 16.
14g.	39.	Archaeological Museum of Adana	Unknown	Height: 4.7			Laflı, Buora 2024, cat. 10, fig. 20.
14h.	40.	Archaeological Museum of Adana	Unknown	Height: 5.2			Laflı, Buora 2024, cat. 9, fig. 18.
15a.	41.	Museum of Kahramanmaraş	Unknown	Height: 4.2			Laflı, Buora 2023, cat. 16.
15b.	42.	Museum of Kahramanmaraş	Unknown	Height: 4.0			Laflı, Buora 2023, cat. 17.
15c.	43.	Museum of Kahramanmaraş	Unknown	Height: 4.8			Laflı, Buora 2023, cat. 18.
15d.	44.	Museum of Kahramanmaraş	Unknown	Height: 4.2			Laflı, Buora 2023, cat. 19.
15e.	45.	Museum of Kahramanmaraş	Unknown	Height: 4.2			Laflı, Buora 2024, cat. 14, fig. 28.
15f.	46.	Museum of Kahramanmaraş	Unknown	Height: 4.1			Laflı, Buora 2024, cat. 15, fig. 29.
15g.	47.	Museum of Kahramanmaraş	Unknown	Height: 4.2			Laflı, Buora 2024, cat. 16, fig. 30.
15h.	48.	Museum of Kahramanmaraş	Unknown	Height: 4.1			Laflı, Buora 2024, cat. 17, fig. 31.
16a.	49.	Archaeological Museum Hatay	Unknown	Height: 4.1			Laflı, Buora 2023, cat. 1.
16b.	50.	Archaeological Museum Hatay	Unknown	Height: 3.9			Laflı, Buora 2023, cat. 2.
16c.	51.	Archaeological Museum Hatay	Unknown	Height: 4.2			Laflı, Buora 2023, cat. 3.
16d.	52.	Archaeological Museum Hatay	Unknown	Height: 4.4			Laflı, Buora 2023, cat. 4.
16e.	53.	Archaeological Museum Hatay	Unknown	Height: 3.7			Laflı, Buora 2023, cat. 5.

No. On the Map	CAT. No.1	Provenance	Archaeological context / Collection	Dimensions in cm	Inscription	Dating / *Note	Bibliography
16f.	54.	Archaeological Museum Hatay	Unknown	Height: 4.5			Lafli, Buora 2023, cat. 6.
16g.	55.	Archaeological Museum Hatay	Unknown	Height: 4.7			Lafli, Buora 2023, cat. 7.
16h.	56.	Archaeological Museum Hatay	Unknown	Height: 4.8			Lafli, Buora 2023, cat. 8.
16i.	57.	Archaeological Museum Hatay	Unknown	Height: 3.7			Lafli, Buora 2023, cat. 10.
16j.	58.	Vicinity of Antakya (Antioch)	Unknown	Height: 3.5			Lafli, Buora 2023, cat. 9.
17.	59.	Lebanon	National Museum of Beirut	Height: 5.0	Ἀστέριος		Rahmani 2003, cat. 22.
18a.	60.	Cyprus	Cesnola Collection, Metropolitan Museum	Height: 4.3	Inscribed	2 nd –4 th c. CE	https://www.metmuseum.org/art/collection/search/244127 , accessed: 22.08.2025.
18b.	61.	Cyprus	Cesnola Collection	Height: 4.3	Εὐθήριος		Rahmani 2003, cat. 20.
18c.	25.	Salamis, Cyprus	Cesnola Collection	Unknown			Rahmani 2003, cat. 36.
19a.	62.	Egypt	Nile Delta	Height: 5.0			Inv. No. 1964.0107.3, British Museum
19b.	63.	Egypt	Unknown	Height: 4.4			Rahmani 2003, cat. 10.
20a.	64.	Near Tel Dan, Northern Israel	Surface finding from 1994.	4.1×1.7×0.6			Rahmani 2003, cat. 34.
20b.	65.	Near Tel Dan?, Northern Israel	Purchased in Jerusalem	3.5×1.6×1.0			Rahmani 2003, cat. 35.
21.	66.	Bet She'an	During the excavations of the Umayyad shops in the Area G, cca 749 CE	3.6×1.4×1.1		cca 749 CE	Rahmani 2003, cat. 33.
22.	67.	Hebron, Judea/Palestina	In the fill under the floor of Unit 2509, in Area 53A, during the 2014 excavations	Height: 3.8	ΥΓΕΙ-ΝΟΝ / ΜΑΡΚ-ΕΛΙΟΝ	2 nd –4 th c. CE	Farhi 2016, p. 46–47.
23a.	68.	Caesarea Maritima	From the excavations				Lifshitz 1961, 122, cat. 14.
23b.	69.	Caesarea Maritima	Find from 1968. Today in the private collection J. Berlin, USA	Unknown			Farhi 2016, fig. 3.
	70.	Syria? Israel?	Purchased in Berlin	3.4×1.3×1.1	ΦΟΙΡΒΑΡΙΟΥ		Rahmani 2003, cat. 25.
	71.	Syria? Israel?	Purchased in Berlin	3.4×1.3×1.1	ΦΟΙΡΒΑΡΙΟΥ		Rahmani 2003, cat. 26.
	72.	Syria? Israel?	Probably purchased in Jerusalem	Height: 3.5	ΦΟΙΡΒΑΡΙΟΥ	* From the same mould as Rahmani 2003, cat. 25–26.	Rahmani 2003, cat. 27.
	73.	Unknown	Purchased in Jerusalem	3.8×2.3×1.4	ΑΛΙΒΟΙ		Rahmani 2003, cat. 38.
	74.	Unknown	Purchased in Jerusalem	5.8×1.8×1.4	Ερμάφιχος	To the 3 rd c. CE	Rahmani 2003, cat. 11.
	75.	Unknown	Purchased in Jerusalem	4.9×1.4×0.7	Ἑόρτιος		Rahmani 2003, cat. 12.
	76.	Unknown	Purchased in Jerusalem	5.4×1.3×1.3	Γολάσης or Γολάσιος, gen. Γολασίου	To the 3 rd c. CE	Rahmani 2003, cat. 13.
	77.	Unknown	Purchased in Jerusalem	4.6×1.5×1.3			Rahmani 2003, cat. 15.
	78.	Unknown	Purchased in Jerusalem	4.6×1.3×1.3	ΟΥ[]Υ[]ΙΟΥ		Rahmani 2003, cat. 16.
	79.	Unknown	Probably purchased in Jerusalem	4.5×1.5×0.7	Ἱερώνυμος		Rahmani 2003, cat. 17.
	80.	Unknown	Probably purchased in Jerusalem	3.7×1.5×0.7	Ἱερώνυμος	* Probably from the same mould as Rahmani 2003, no. 17.	Rahmani 2003, cat. 18.
	81.	Unknown	Probably purchased in Jerusalem	Height: 4.3	ΕΥΘΗ/ΠΙΟΥ Εὐθήριος		Rahmani 2003, cat. 19.
	82.	Unknown	Purchased in Jerusalem	4.6×1.5×1.3	ΙΕΙ/ΙΝΟΥ		Rahmani 2003, cat. 21.
	83.	Unknown	Purchased in Jerusalem	4.2×1.2×1.1			Rahmani 2003, cat. 37.
	84.	Unknown	Purchased in Jerusalem	4.0×1.6×1.2			Rahmani 2003, cat. 28.
	85.	Unknown	Purchased in Jerusalem	3.5×1.5×1.1	Δρακόντιος		Rahmani 2003, cat. 29.
	86.	Unknown	Purchased in Jerusalem	3.6×1.5×1.2	Δρακόντιος		Rahmani 2003, cat. 30.
	87.	Unknown	Purchased in Jerusalem	3.5×1.5×1.1	Δρακόντιος		Rahmani 2003, cat. 31.
	88.	Unknown	Purchased in Jerusalem	3.2×1.4×1.2	Δρακόντιος		Rahmani 2003, cat. 32.
	89.	Unknown	Purchased in Israel, now in the Ch. Schmidt Collection, Munich	Weight: 14.5 gr			Farhi 2016, fig. 4.
	90.	Unknown	Israeli Museum	Weight: 23.12 gr			Farhi 2016, fig. 5.
	91.	Unknown	Purchased in Yugoslavia (Macedonia?)	4.1×1.4×1.11			Rahmani 2003, cat. 24.
	92.	Unknown	Purchased in Macedonia	4.7×2.0×1.3	ΕΟΤΟ /ΕΥΓ/ΟΡΕΙ		Rahmani 2003, cat. 23.

Several authors have offered interpretations of the intended function of miniature lead amphorae, basing their conclusions primarily on typological analysis rather than interdisciplinary studies of the contents preserved within these vessels. The most significant and comprehensive study of this category of finds was conducted by Levy Yizhaq Rahmani in 2003. Rahmani analysed approximately 70 specimens, 38 of which he included in a catalogue accompanied by detailed typological, epigraphic, and spatial analysis.²⁴ Notably, Rahmani was the first to address the terminology used to describe these objects. In earlier literature, they had been erroneously referred to as *ampullae*, a term more appropriately associated with objects of Christian symbolism and of a different typological form.²⁵

According to Rahmani, the amphora-like shape of these miniature vessels should be understood as a stylized or caricatured version of actual amphorae, adapted to serve as small containers for precious substances such as medicines, liquids, powders, or ointments. He was also the first to propose a typological classification, dividing the lead amphorae into three basic types.²⁶ However, this system remains relatively rudimentary, as it does not account for mixed or transitional forms, thereby limiting a more nuanced understanding of typological variation.²⁷ The lead object from *Naissus* represents a distinct type, or at least a variant falling between Rahmani's types A and B. In terms of dimensions, the *Naissus* specimen aligns with the standard measurements of other known examples, which generally range between 3.5 and 5.5 cm in height.²⁸

The *Naissus* amphora also shares notable similarities with a specimen discovered in 2014 during excavations at Tel Hebron (Fig. 5.1). That find, originating from Roman Judea/Palestine, measures 3.5 cm in height, weighs 12.51 g, and has an internal volume of 1.4 cc. Its surface is decorated with a lattice of oblique rhombuses, each enclosing a central granule. An inscription appears on the neck—MAPK-EAION—and another on the shoulder—YTEI-NON.²⁹ On palaeographic grounds, the inscription has been dated to the 2nd–3rd century CE, while the archaeological layer in which it was found contains material spanning from the 1st to the 5th century CE.³⁰

Given that the *Naissus* object was recovered from a medieval waste deposit and that no reliable Roman stratigraphic layer was identified during the excavation, its archaeological context does not allow for

precise dating. In this case, an analysis of the epigraphic content of the inscription may provide a valuable clue for establishing a more accurate chronological framework.

Analysis of the inscription

The inscription on the lead object is partially obscured due to significant surface weathering—a problem also encountered in comparable specimens from Anatolia and the Levant.³¹ A. Jovanović was able to discern only the clearly legible second (lower) row, in which the letters PIN are distinctly visible, flanked by plant motifs. As previously noted, he interpreted these letters as the initials of the Latin phrase *P(ondo) I(un) N(aisi)*, based on his hypothesis that the lead object served as a weight.³² While this interpretation may have appeared plausible, it rests on the assumption that the first (upper) row is unreadable. However, this row, though faint, is not entirely illegible, as confirmed by both a drawing of the object and direct visual inspection. In the present study, we offer a renewed attempt to decipher the full inscription by integrating the extant visible letters with the drawings published by V. Korać in 2002 (Fig. 4).³³ That publication includes two illustrations of the inscription, in which the archaeological draftsman sketched most of the letters in the upper row.³⁴ The original drawing was likely made in the field during the 1960s, and the identity

²⁴ Rahmani 2003, 40–55.

²⁵ Rahmani 2003, 33.

²⁶ Rahmani 2003, 34. He classified lead amphorae with elongated necks, slightly pronounced shoulders, and pointed bases into Type A; the handles are set at right angles. This type is dated to the 1st–3rd century CE. Type B features a cylindrical neck, bulbous body, and stump base, and is dated to the 5th–8th century CE. Type C, the rarest according to Rahmani, resembles Type B but has a straight body extending from neck to base, lacks shoulders, and ends in a rounded bottom. It is dated to the 2nd–3rd and 4th–5th centuries CE.

²⁷ Some authors have criticized this typological systematization, particularly the proposed dating of the types. Cf. Farhi 2016, 51–52; Laflı, Buora 2023, 150–151.

²⁸ Although examples measuring 7.3 and 7.5 cm have also been recorded (Théroutanne, Nord-Pas-de-Calais, and Delos; Table 1, nos. 1 and 22), or even 8.2 cm (Pavlikeni; Table 1, no. 14).

²⁹ Farhi 2016, 47.

³⁰ Farhi 2016, 52.

³¹ Rahmani 2003, 43–48.

³² Јовановић 2003, 49.

³³ Кораћ 2002.

³⁴ Кораћ 2002, Т. IX, 149.

and current whereabouts of the draftsman remain unknown. Nonetheless, it has been determined that the draftsman had no formal training in Greek epigraphy or palaeography, and the accuracy of the lettering appears largely coincidental. This observation is of particular relevance: despite the draftsman's apparent unfamiliarity with Greek—and, more significantly, their unawareness that the inscription was in Greek—they nonetheless succeeded in rendering the characters with a high degree of accuracy. This fact was overlooked by subsequent researchers who first analysed and published the artifact. When considered in conjunction with direct visual analysis, the draftsman's rendering offers a solid foundation for a plausible reconstruction of the inscription.

It is reasonable to begin the reconstruction of the inscription from the letter positioned directly above the P in the lower row, as this P is unequivocally the first letter of that line. To the left of this point lies the edge of the mould mark, which likely indicates the beginning of the inscription. Starting from this position—immediately above the P—one can discern, with relative clarity, the Greek letter E (epsilon) in uncial form, followed by a rather weathered I (iota), which was not outlined in the drawing, and then a P (rho). A crucial clue that the upper row is inscribed in Greek is the presence of a clearly legible Ω (omega) in its distinctive uncial form, followed by a majuscule N (nu), which, although faint, appears in the drawing. The mould mark follows immediately after this letter. In the second drawing, proceeding from left to right beginning at the mould mark, the next letter appears to be an extremely worn O (omicron), as represented in the sketch. However, a dot-like mark within this circular letter—visible in photographs but overlooked by the draftsman—could suggest the presence of a Θ (theta) rather than an O. This feature may simply be a product of surface weathering and was consequently disregarded in the schematic rendering. Notably, the letter's small size and high position within the inscription evoke certain features of Hellenistic scripts, as observed in comparable examples.³⁵ The subsequent letter is severely damaged and, thus, difficult to identify. It may have originally been a Greek uncial C (used to represent sigma in literary uncial script). In rendering this heavily eroded section, the draftsman appears to have reproduced an uncial C (sigma), almost certainly without recognizing its Greek identity. While this reading remains the most probable, alternative interpretations cannot be excluded. For instance, one

might consider that the sign could represent a Φ (phi) or even a Ψ (psi). Yet such interpretations appear semantically implausible, even though there is sufficient space between OC(?) and the clearly distinguishable H that follows. Consequently, the mark in question may not be a single “C” at all, but perhaps a Ψ (psi) or a Φ (phi)—though, again, neither of these readings is convincing. The sequence concludes with the aforementioned clearly distinguishable H (eta), having ascertained that all the characters in the upper row are Greek.

Therefore, the reading of the inscription, from E (epsilon) to H (heta), is ΕΙΡΩΝΟΧ, while the lower row contains the letters ΠΙΝ, forming the complete sequence: ΕΙΡΩΝΟΧ/ΠΙΝ. If we accept this sequence and read the inscription from left to right, following the upper row between the two borders formed by the mould marks, the reconstructed reading could be ΕΙΡΩΝΟΧ Η ΠΙΝ. The first hypothesis is that the phrase ΕΙΡΩΝΟΧ/ΠΙΝ could mean “the nose of the dissembler,” as εἰρωνοχ appears to be the singular masculine genitive of the third declension, with the stem εἰρων- almost certainly visible. The letter Η (ἡ in Classical and Koine Greek), which is clearly legible, is possibly the singular feminine definite article preceding the word πίς. The presence of a possessive genitive for what is likely a personal name could be supported by comparative evidence, albeit from a small corpus – such as the known examples published by Rahmani in 2003 – which suggests that, at least in some cases, a personal name functioned as a *titulus possessionis*.³⁶ Grammatically, it is important to consider that the Classical Greek noun ρίς (rhis), meaning “nose,” had undergone lexical evolution by the Roman period, becoming ρῖν (rhīn) in the nominative. Consequently, one possible interpretation is that the entire phrase should be translated as “the dissembler's nose” in Attic and Koine Greek – thus, εἰρωνοχ ἡ ρῖν, assuming that εἰρων functions as a common noun meaning “dissembler,” i.e., someone who expresses less than what he truly thinks. However, a more plausible interpretation is that εἰρων should instead be transcribed as Εἰρων, a Greek personal name attested in Hellenistic Boeotia during the 3rd and 2nd centuries BCE, as well as once in Late Classical Thessaly in the

³⁵ Thompson 1912, 106, 110, 118; Marengo, Taborelli 2013, 125.

³⁶ Rahmani 2003, 36–37; 43, cat. 11; 44, cat. 12, 13; 45, cat. 14; 46, cat. 17; 47, cat. 18, 19; 48, cat. 20; 49, cat. 22; 52, cat. 30, 31.

mid-4th century BCE.³⁷ Notably, all known attestations of the name *Eἶρων* derive exclusively from epigraphic evidence in Late Classical and Hellenistic Greece. On the other hand, comparative evidence from published, though tentatively dated, miniature lead amphorae from Anatolia and the Levant strongly suggests the possibility that *Eἶρων* in the singular genitive of the third declension refers to a specific individual and that the lead object was associated with that person's nose.

Another possible interpretation is that after PIN and the decorative plant motif there seems to be a Ψ (psi). This, however, also proves morphologically implausible, as no Greek lexeme or compound is attested in which Ψ follows the stem *ρῖν*-. One might still propose such a reading on the assumption that *ρῖν* represents a truncated form of the genitive (e.g., *ρῖν*-ικόν, *ρῖν*ώδες, etc.), which would better align with the typical structure of dedicatory or identifying inscriptions. Yet, the complete absence of Greek textual or epigraphic evidence for any formation combining *ρῖν* with Ψ renders this interpretation unlikely—this applies equally to the entire sequence following PIN. Consequently, no further characters can be securely identified after *ρῖν*, and the Ψ-shaped figure is best interpreted not as a letter but as a plant motif consistent with the other decorative elements in the sequence, before and after it.

Regarding the dating of the object, it is difficult to establish a precise timeframe based on the text and lettering alone. As is well known, Greek uncial lettering first appeared in the Hellenistic period and continued into the Roman Imperial era, making it inadvisable to rely solely on palaeographic evidence for dating.³⁸ Therefore, using the presence of uncial letters such as E, ω, and C as the primary criterion for dating presents a significant challenge, as it implies an extremely broad chronological range beginning in the 3rd century BCE.³⁹ If we assume that *Eἶρων* is a personal name, the most plausible explanation is that it originates from Hellenistic Greece, particularly in Boeotian contexts, with attestations ranging from the mid-4th to the late 2nd century BCE, according to the *Lexicon of Greek Personal Names*.⁴⁰ Regarding the lexical evolution of the Greek word for “nose,” *ῥίς* (*rhis*) into *ρῖν* (*rhīn*) in the nominative, authoritative Greek dictionaries indicate that this transition occurred sometime between the Hellenistic and Roman Imperial periods, thereby once again suggesting a broad chronological range.⁴¹ A survey of Greek texts shows that the form *ρῖν* in the nominative appears to have been firmly es-

tablished by the 2nd and 3rd centuries CE in authors such as Aretaeus of Cappadocia, Lucian, Soranus, and Iamblichus.⁴² A preliminary conclusion regarding this inscription is that it most likely contains a Greek personal name in the genitive form, followed by a definite article and a noun meaning “nose.”

One particularly intriguing aspect of interpreting PIN (*ρῖν*) as “nose” is that Theophrastus mentions how perfumes in Classical Greece were stored in either lead or alabaster vessels to prevent their deterioration. A cautious conjecture can, thus, be proposed: given its hollow nature, this lead object may have contained a small amount of a liquid, medicine, or perfume intended for nasal use. In *Concerning Odours*, Theophrastus states the following:⁴³

“Διὸ καὶ εἰς ἀγγεῖα μολυβδᾶ ἐγχέουσι καὶ τοὺς ἀλαβάστρους ζητοῦσι τοιοῦτου λίθου· ψυχρὸν γὰρ καὶ πυκνὸν καὶ ὁ μόλυβδος καὶ ὁ λίθος ὁ τοιοῦτος· καὶ ἄριστος τοῖς μύροις ὁ μάλιστα τοιοῦτος. Ὡστε δι’ ἅμφω τηροῦσι, καὶ τῷ ψυχρῷ καὶ τῷ πυκνῷ, μήτε διέεντες ἔξω τὴν ὁσμὴν μήθ’ ὅλως ἐπιδεχόμενοι μηδέν. Καὶ γὰρ ἡ ἀναπνοὴ φθείρει καὶ τὸ ἔξωθεν ἐπεισιὼν καὶ ἀλλότριον· ἐπεὶ καὶ τὰ πνεύματα φθείρει καὶ καταναλίσκει καθάπερ ἐλῆχθη τὰς ὁσμάς, ἄλλως τε καὶ τὰς μὴ φυσικάς.”

This is why people store perfumes in lead vessels and seek out alabaster phials – since alabaster has the desired properties. Lead is naturally cool and dense, and alabaster shares these characteristics, making it the ideal material for preserving fragrances. These containers protect perfumes in two ways: by maintaining a cool temperature and by preventing the scent from escaping or foreign substances from seeping in. Evaporation weakens the fragrance, and external

³⁷ Inscriptiones Graecae: IG VII 2813, 8; IG VII 2716 II, 8; IG VII 3377, 6; IG II² 175, 8; IG VII 2715, 2. L'Année Épigraphique: AE 1936, Chronique p. 43 no. 220 II, 6. Supplementum Epigraphicum Graecum: SEG III 361, 11; SEG III 360, 14; SEG XXI 244 (date). Bulletin de Correspondance Hellénique: BCH 23 (1899), p. 193, no. 2, 19; BCH 23 (1899), p. 93, no. 3, 4.

³⁸ Concerning the difficulties in dating Greek inscriptions on palaeographical grounds see: McLean 2002, 40–42.

³⁹ Thompson 1912, 144–147.

⁴⁰ Fraser, Matthews 2000, 130.

⁴¹ H. G. Liddell, R. Scott, H. S. Jones, *A Greek-English Lexicon*, rev. R. McKenzie (Oxford: Clarendon Press, 1940), s.v. *ῥίς*, accessed 05.03.2025. https://atlas.perseus.tufts.edu/dictionaries/entry/urn:cite2:scaife-viewer:dictionary-entries.atlas_v1:lsj-92527/.

⁴² Aretaeus, *De causis et signis acutorum morborum* 1.2; Lucian, *Asinus* 12; Soranus, *De fasciis* 11; Iamblichus, *Protrepticus* 122.4.

⁴³ Theophrastus, *Concerning Odours*, 4.41.

elements can also degrade it. Even air currents can diminish and dissipate scents, especially those that are not naturally part of the substance.

At this point, it is important to emphasise that this remains merely a hypothesis, given the conjectural nature of the inscription's reading. Turning to Latin sources, Pliny the Elder, in his *Natural History*, mentions the use of lead storage vessels for holding perfumes to prevent their degradation, though he refers specifically to large lead containers.⁴⁴ Furthermore, Martial notes that the lead vessels of the perfumer Nicero were renowned in his time, as reflected in the following epigram:⁴⁵

“Quod semper casiaque cinnamoque
Et nido niger alitis superbae
Fragras plumbea Nicerotiana,
Rides nos, Coracine, nil olentis:
Malo, quam bene olere, nil olere.”

*Because you always reek of cassia and cinnamon,
and of the nest of the proud blackbird,
perfumery-laden in lead, Nicerotian—
you mock us, Coracinus, for having no scent at all?
I would rather have no scent at all than smell too sweet.*

The picture presented by the literary sources is quite intriguing, but their correlation with the lead object remains uncertain and can only be considered a possible suggestion, as our reading, while plausible, remains tentative.

Review of inscriptions on miniature lead amphorae

At this point, it is particularly important to discuss the Greek names in the genitive found on other similar lead amphorae. These specimens are examined in detail by Rahmani in his 2003 study and originate from miniature lead amphorae that are typologically similar to our example. Starting from the first name, Rahmani erroneously reads the name *Ερμάφιχος* due to the abbreviation EPM/ΦΣ,⁴⁶ which is unattested in the Lexicon of Greek Personal Names. In contrast, the aforementioned researcher refers to the name *Ερμάφιλος*, which is attested more than sixty times from the Classical period to Late Antiquity. The occurrence of this name peaks between the 2nd century BCE and the 2nd century CE, with the highest frequency in Attica, Lycia, and Thrace.⁴⁷ Another putative name attested on a miniature lead amphora, as suggested by Rahmani, is *Εόρπιος*. This hypothesis is based on the Greek letters EOP/E, which appear on a lead miniature amphora

purchased in Jerusalem. However, Rahmani's conjecture remains speculative due to the fragmentary nature of the evidence. The name itself is attested in Classical and Hellenistic Greece and occasionally in the Roman Imperial period.⁴⁸ The clearly depicted name *Γολάσης* or *Γολάσιος*, derived from the genitive *Γολασίου*, appears on a 3rd-century CE altar from Homs, while variants such as *Γαλέσσον* or *Γόλεσσον* are found on Greek funerary stelae from Syria. Rahmani also suggests that the name *Gals* appears in Talmudic inscriptions.⁴⁹ A similar lead object from Rome bears the name *Μακεδόνης*.⁵⁰ This name is particularly prevalent in archaeological contexts from the Imperial Roman period and Late Antiquity in Aegean Greece and Asia Minor. It is attested a few times in Classical and Hellenistic Greece and also appears in the Middle Byzantine era.⁵¹ Rahmani's published lead miniature amphorae further suggest at least one instance of the name *Ἰερώνυμος*, a well-documented name attested dozens of times from the Classical period to Late Antiquity. Its occurrences peak from the Hellenistic period through the later Roman Empire.⁵² Regarding the name *Εὐθήριος*, Rahmani identifies it on a specimen purchased in Jerusalem and dates it, on palaeographic grounds, to a *terminus ante quem* of 211 CE.⁵³ *Εὐθήριος* was a rare name, attested once in the Classical era and twice more in the 4th and 5th centuries, respectively, with instances from Thessaloniki and the Greek colonies on the northern coast of the Black Sea.⁵⁴ The name *Ἀστέριος*, attested on an example from the National Museum of Beirut, appears multiple times, almost exclusively in Anatolian

⁴⁴ Plin. Nat. 13.2.19

⁴⁵ Mart. 6.55.3

⁴⁶ Rahmani 2003, 43, cat.11; 58. See note 56 on SEG XXI, no. 1023.

⁴⁷ Fraser, Matthews 1987, 163; Osborne, Byrne 1994, 156; Fraser, Matthews 1997, 152; Fraser, Matthews 2000, 143; Corsten 2010, 163; Balzat et alii 2013, 148; Balzat et alii 2018, 145–146.

⁴⁸ Osborne, Byrne 1994, 143; Corsten 2010, 156.

⁴⁹ Rahmani 2003, 44, cat. 13.

⁵⁰ Rahmani 2003, 45.

⁵¹ Fraser, Matthews 1987, 296; Osborne, Byrne 1994, 296; Fraser, Matthews 1997, 286; Fraser, Matthews 2005, 218; Corsten 2010, 277; Balzat et alii 2013, 268; Balzat et alii 2018, 257.

⁵² Fraser, Matthews 1987, 233; Osborne, Byrne 1994, 234; Fraser, Matthews 1997, 217; Fraser, Matthews 2000, 206; Fraser, Matthews 2005, 172; Corsten 2010, 223–224; Balzat et alii 2013, 212; Balzat et alii 2018, 192.

⁵³ Fraser, Matthews 2000, 76; Rahmani 2003, 47, cat. 19; Corsten 2010, 86; Balzat et alii 2013, 74; Balzat et alii 2018, 71.

⁵⁴ Fraser, Matthews 2005, 131.

contexts from the Imperial period to Late Antiquity.⁵⁵ Finally, the name *Δρακόντιος*, stemming from three examples published by Rahmani,⁵⁶ is infrequently attested (a total of six times) throughout Classical Antiquity and the Early Byzantine period. The three attestations from the 3rd and early 4th centuries, as well as from the Byzantine period, all originate from Asia Minor.⁵⁷

It is important to underscore that all the names appear in the genitive case and are in Greek. A particularly interesting example of a lead miniature amphora bearing an inscription in Latin is a specimen from Cingoli, in Marche, central Italy, which, like our example, originates outside an excavated context.⁵⁸ This miniature lead vessel contains an inscription that, according to the authors, could be read in several ways: aromaticum Ambrosi atrum authemerum, meaning “the dark authemerum of Ambrosius, aromatic”; aromaticum ambrosium Atruni authemerum, meaning “the aromatic Ambrosian authemerum of Atrunus”; Atruni authemerum aromaticum ambrosium, meaning “the Ambrosian aromatic authemerum of Atrunus”; or atrum authemerum aromaticum Ambrosi, meaning “the dark, aromatic authemerum of Ambrosius.”⁵⁹ While the reading remains particularly contentious, according to its researchers, what distinguishes this example is the presence of the genitive, referring either to Ambrosius or to Atrunus. This suggests that the genitive case signified ownership of the miniature lead amphora, much like the Greek examples previously examined and published by Rahmani. Conversely, this Latin-inscribed miniature lead amphora, originating from the antiquities market and dating to the Late Republican period, shares a few characteristics with both our Greek-inscribed specimen and the Greek-inscribed examples researched and published by Rahmani. First, they all feature a name in the genitive, implying possession. Second, they are typologically similar. Third, there is an indication that they contained some form of medication specifically intended for personal use, though this last similarity remains the most speculative. Despite the conjectural nature of this last point, it is important to underscore that vessels made of lead were well-known for being used for the storage of medical substances, perfumes, and other cosmetics.⁶⁰

Concluding remarks

Dating the inscription on the miniature lead amphora from Naissus on palaeographic grounds is not particularly feasible, as uncial script appears as early as the Hellenistic period and remained in use through-

out the Roman Imperial era. Nonetheless, comparative evidence strongly supports that the inscription is in Greek and most likely referred to an individual named Εἰρων. This is supported by epigraphic attestations of the name in Late Classical Thessaly and multiple examples from Hellenistic Boeotia. This reading is further substantiated by analogous miniature lead amphorae, which also bear personal names in the genitive, as discussed above. Taken together, the comparative onomastic evidence and typological parallels suggest that the Naissus specimen dates at least to the Roman Imperial period, if not earlier. This is consistent with the chronology of similarly inscribed amphorae. Additionally, the existence of a single Latin-inscribed example, although somewhat earlier,⁶¹ reinforces this timeframe and may offer further avenues for interpretation. It is also plausible that the contents of the Naissus amphora were intended for nasal application, just as the Latin-inscribed specimen likely contained medicine for ocular use.

Given the name and the palaeographic features, the Naissus amphora may predate the archaeological context in which it was found, indicating that it is a stray find from the Roman period (or earlier). In a broader archaeological context, the discovery of this lead amphora may be linked to the population inhabiting the eastern suburban zones of Roman Naissus, particularly the area corresponding to the modern-day Jagodina Mala and Pantelej city quarters. This area has yielded sporadic evidence of cremation burials from the 2nd to 3rd centuries CE, attesting to continued sporadic occupation during the Roman Imperial era. The remains of a Roman-era settlement have not been confirmed in this part of Naissus to date, except for the aforementioned findings of bricks and tiles used in the construction of one of the buildings on the site of the medieval necropolis near the church of St Panteleimon. However, recent archaeological excavations in August 2025, have revealed part of a Roman non-residential (probably warehouse) building from the 4th

⁵⁵ Rahmani 2003, 49, cat. 22.

⁵⁶ Rahmani 2003, 52, cat. 30.

⁵⁷ Fraser, Matthews 1997, 134; Corsten 2010, 148; Balzat et alii 2013, 125; Balzat et alii 2018, 131.

⁵⁸ Marengo, Taborelli 2013, 117–127.

⁵⁹ Marengo, Taborelli 2013, 125–126.

⁶⁰ Blümner 1897, 562.

⁶¹ Marengo, Taborelli 2013, 125.

century CE,⁶² located approximately 300 m south of the St Panteleimon Church, which could indicate the existence of a smaller settlement on the edge of the late antique necropolis. However, it remains unclear how the lead object ended up in the medieval context.

We can assume that it was stored and collected as a secondary raw material for future processing, considering that metal was a valuable raw material throughout history, from the Roman era to Late Antiquity and the Middle Ages.

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⁶² Research in the yard of the “Stefan Nemanja” elementary school, led by the Institute for the Protection of Cultural Monuments from Niš, under the direction of Aleksandar Aleksić, M.A. and Prof. Dr Marko Janković. The Research Supervisor is Dr Gordana Jeremić. The processing of materials and documentation is still in progress.

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ОЛОВНИ ПРЕДМЕТ У ОБЛИКУ АМФОРЕ СА НАТПИСОМ ИЗ НАИСА (*NAISSUS*)

Кључне речи. – Ниш – *Naissus*, минијатурна оловна амфора, увоз, грчки натпис, античка медицина, античка фармакологија, обољења носа, античка козметика, римско доба

Током систематских истраживања шездесетих година 20. века на простору претпостављене средњовековне цркве из доба Стефана Немање, у порти данашње Цркве Светог Пантелејмона у Нишу (ГО Пантелеј), пронађен је оловни предмет са грчким натписом. Предмет у облику минијатурне амфоре, делимично оштећен у тренутку открића, висине је 4,2 цм, ширине 1,8 цм и тежине 18,43 г. Предмет је пронађен у такозваној керамичкој јами, на простору олтара претпостављене цркве из 12. века и некрополе 12–13. века. Испуну јаме чинили су релативно малобројни фрагменти керамике и предмети од стакла и метала из средњовековног периода.

Минијатурни оловни суд из Наиса објављиван је у три наврата (Кораћ 2002; Јовановић 2003; Ракоција 2008) и интерпретиран је као налаз официјелног, метричког карактера (Јовановић), или ранохришћанске симболике (Ракоција). Оваква врста посуда од олова налажена је у ширем медитеранском басену и припада продукцији од римског доба до времена пре 749. године н. е. До сада је познато преко 150 оваквих предмета, углавном прибављених на тржишту антиквитета, а веома ретко са археолошких истраживања. Садржај посуда могао је да буде у облику масти, праха или течности, могуће коришћен у медицини, фармацији или козметици.

Оловни предмет из Наиса по својој форми сличан је налазу из Тел Хеброна у Римској Јудеји / Палестини. Оловна амфорица из Тел Хеброна потиче са археолошких истраживања 2014. године и нађена је у слоју датованом између

1. и 5. века. На основу палеографских карактеристика натписа, предмет је ближе опредељен у период 2–3. века, што би одговарало и датовању нишког примерка.

На основу анализе епиграфског садржаја натписа из Наиса дошло се до његовог читања као ΕΙΡΩΝΟΧ/ΡΙΝ, што би у слободнијем преводу могло да значи *Иронов нос*, те да је садржај бочице могао бити коришћен у третману или лечењу носних обољења. Упоредни примери указују да Εἴρων највероватније грчко лично име пре него именица εἴρων, са потврдама у каснокласичној Тесалији и хеленистичкој Беотији. Натпис је свакако на грчком и највероватније је припадао особи по имену Εἴρων. Ово тумачење додатно поткрепљују аналогни примери, који такође садрже грчко име у генитиву (в. табелу 1). Ономастички докази из других примера указују на то да примерак из Наиса датира барем из римског царског периода, с обзиром на то да слично исписане минијатурне оловне амфоре такође припадају овом временском оквиру, ако не и ранијем периоду.

Археолошка истраживања ширег ареала Цркве Светог Пантелејмона у Нишу нису пружила податке о постојању насеља из римског доба на том месту. У ширем археолошком контексту, налаз ове оловне амфоре могао би се повезати са становништвом источних приградских зона Наиса, где спорадични налази гробова кремираних покојника из 2–3. века у данашњој четврти Јагодин Мала сведоче о присуству становништва на овом простору у римско царско доба.

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MARGINALISATION IN DEATH: NEW-BORN BURIALS AT REMESIANA EASTERN NECROPOLIS

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Abstract. – Systematic archaeological research at the eastern necropolis lasted from 2018 to 2023, resulting in 63 discovered graves. According to the unearthed coinage, the necropolis was used mostly in the second half of the 4th century, putting it at the early stages of the institutionalisation of Christianity in the region. Unlike the rest of the necropolises near Remesiana, the eastern one is specific because of its unique burial types – graves with *mensae*, built using the dry-stone wall technique. Several such objects were discovered in previous years, all indicating great effort, time and care for the dead.

On the other hand, the youngest among the deceased had a completely different treatment in death. Many of the 63 graves belong to children and juveniles (28 burials, or 44 %), but there are at least 7 burials of new-borns (11%). Those cases are mostly specific since they were all buried in shallow graves, with no visible signs of any marking and with no objects in the graves. So far, it looks as though they were all buried relatively close to each other, so we cannot exclude the possibility of a “new-born’s area” at the necropolis. The interpretations are complicated since there is strong evidence that pagans and Christians were buried side by side in the eastern necropolis, so it is not easy to explain such customs. These new-borns were marginalised within their respective societies for some reason, and we will try to offer some answers in this paper.

Keywords. – New-born burials, Late Roman period, Dacia Mediterranea, Remesiana, burial customs, pagans, early Christians, marginality

The archaeology of death and burial has been an important topic within the discipline from its very beginning. To date, a myriad of papers and books have been published on various subjects concerning different aspects of death, body treatment, burial practices and their meanings, and there are no signs that the topic is ever going to be exhausted. However, the very nature of knowledge and its ability to constantly change and grow leads us through different theoretical and methodological perspectives, so we are often able to tell somewhat different stories about the dead, again and again. At the same time, topics concerning the lives (and deaths) of children in the past and childhood in general have become more present in archaeology only since the 1990s.¹ Specific fea-

tures of children’s burials, body treatment, and perimortem and postmortem practices became an important subject for scholars from all over Europe. Similar situations occurred with academics dealing with the Roman (and Late Roman) period in archaeology and ancient history. Historical texts were scrutinised, and the art and images were revisited together with the archaeological collections and the documentation kept in museums.²

¹ Bradley 1991; Dixon 1992; Demand 1994; Saller 1994; Pearce 2001; Coşcunsu 2015; Murphy, Le Roy 2017; Creţu 2023, 99; Kamp-Whittaker et al. 2024.

² Pearce 2001; Dasen 2010; Carroll 2018.

In Serbia (and Yugoslavia), there were only a few examples of studies of family or childhood for a long time. Only in the last couple of decades have these topics gained a stronger momentum, and many papers have started to cover different aspects of childhood, womanhood and family life altogether. This mainly coincides with the somewhat rapid development of bioarchaeology in Serbia – more studies have been conducted in the last decade than ever before, thanks to (among other factors) a much greater number of fully professional and trained bioarchaeologists.³ Simply, the accumulation of completely new sets of data made it possible to take different approaches when discussing the lives of the people in the past. Roman archaeology became far more interesting with several studies published recently.⁴

In comparison to the earlier period, new-born burials in Late Roman cemeteries are present in smaller numbers, and in some cases are unpublished. Very careful and precise excavation at the eastern necropolis of Remesiana enabled us to discover and document such cases where new-borns were buried inside the necropolis. The main focus of this paper is to raise the right questions concerning these burials and to try and find at least some of the answers.

Late Roman Remesiana

The Late Roman city of Remesiana lies beneath the modern town of Bela Palanka in south-eastern Serbia, some 40 km east of Niš. It was built on the left bank of the Mokranjska river – a tributary to the much bigger, Nišava river in the middle of Bela Palanka valley (Fig. 1). The position was strategically important for urban development, since the city was near the *Via Militaris*, just between two great centres in Antiquity – Naissus and Serdica. It is also assumed that the road forked in Remesiana, with one prong leading to Niševac (Tima-cum Maius?), while the other one led south to Vlasina and Pautalia.⁵ Furthermore, it is quite possible that Remesiana was once a *mansio* on that road and only later developed as a greater civilian agglomeration.⁶

The first information on Roman ruins in Bela Palanka – fortress walls, inscriptions and pillars – was noted as early as the 11th century,⁷ but the most detailed reports came from military envoys and travellers – Count Marsigli in the 18th century and Felix Kanitz in the late 19th century.⁸ At the very end of the 19th century, railway engineer Dušan Sabovljević conducted the first (amateur) excavations and unearthed several tombs at the southern necropolis of Remesiana⁹ and

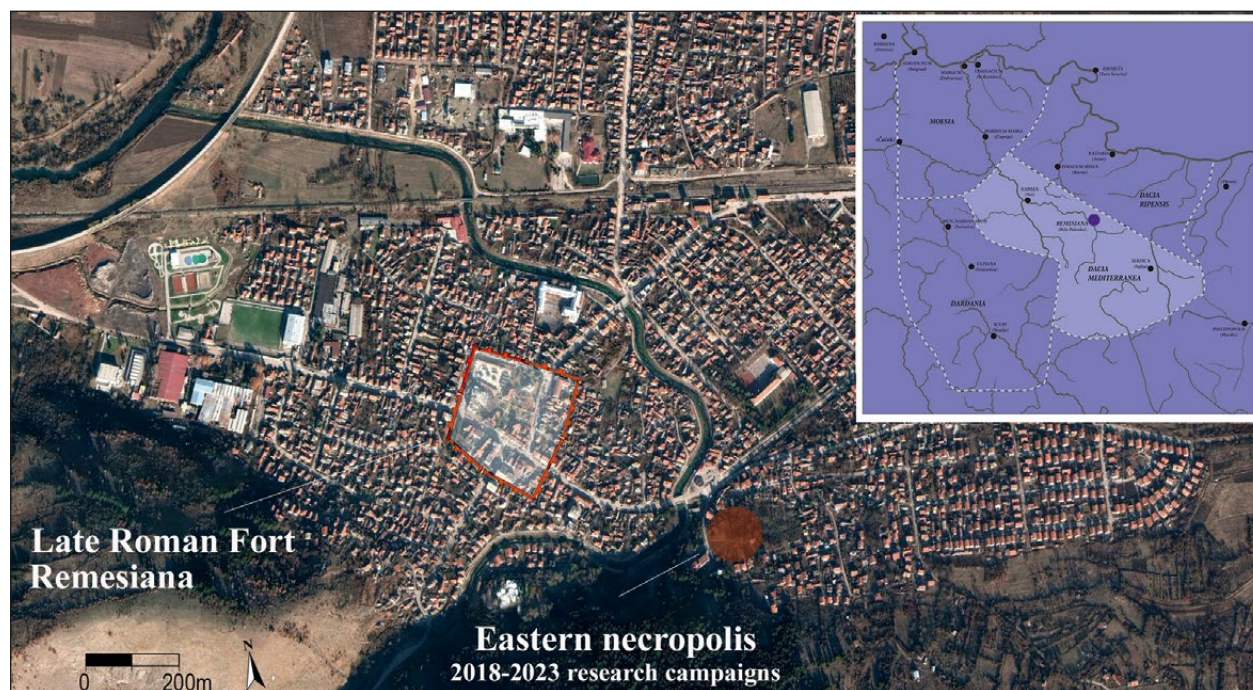


Fig. 1. Map of Bela Palanka with positions of Late Roman fort and necropolis (drawings: M. Janković and J. Premović)

Сл. 1. Карта Беле Паланке са обележеним позицијама касноримског утврђења и источне некрополе (цртање: М. Јанковић и Ј. Премовић)

the first building outside the city walls of Remesiana.¹⁰ In the first half of the 20th century, a great number of accidental finds (tombs, walls, pillars and small finds) were made, while the first professional archaeological excavation was conducted only after World War II, by the National Museum of Serbia researchers in 1956. The interior of the Ottoman fortress was excavated, and the first stratigraphic data was defined, recognizing different Roman, Byzantine and Ottoman horizons of the fort. Also, at the same time, the western necropolis and basilica *extra muros* were discovered.¹¹ During the late 70s and early 80s, archaeologists of the National Museum of Serbia, this time with the help of the Institute for Protection of Cultural Monuments in Niš, excavated the very centre of modern Bela Palanka, where public buildings, basilica and part of the forum were discovered and conserved.¹² In the last decade of the century, an excavation of a churchyard (Town church of Ascension of the Lord) was organized. Since the place was once within the walls of the Roman fort, more detailed insight into the stratigraphy (of not only Roman but all later fortifications at the location) has been accomplished, and a part of another building was discovered. Finally, several sites from the Late Roman period have been found near Remesiana, mostly thanks to archaeological activity prompted by the construction of the E80 motorway at the beginning of the 21st century.¹³

The topography of Remesiana shows a typical Late Roman city with a trapezoid ground plan of the fort with towers, and main communications with gates at their respective ends, together with the forum, the basilica and the public buildings in the centre.¹⁴ At the same time, near the city, necropolises were placed on all four sides, almost encircling it. Finally, a little further from the city walls and necropolises, on the banks of the Nišava river, several villas, some agricultural properties and some probably made for leisure, have been discovered. Most of the finds uncovered in the territory of Bela Palanka are dated to the 4th century,¹⁵ and just a few examples could be dated as early as the beginning of the 3rd century, like the “famous” commemorative inscriptions dedicated to the emperors Septimius Severus and Caracalla,¹⁶ or the remains at the Jeleničevo site, where the original *mansio* of Remesiana has been assumed.¹⁷ Traditionally, Remesiana is labelled as a Late Roman and, at the same time, early Christian centre. Many different traces of practising Christianity have been discovered (pillar capitals with inscribed crosses, adaptations of civil basilica, small finds, etc.) through-

out Bela Palanka, and Remesiana is mentioned multiple times as a residence of the renowned missionary and theologian bishop Nicetas, and, somewhat later, bishop Diogenianus.¹⁸

Eastern necropolis of Remesiana

Most of the data from Remesiana came from systematic and protective research carried out over the last 70 years, but many more came from accidental finds. From the end of the 19th century onward, dozens of graves and tombs have been found, thanks to the development and expansion of the town of Bela Palanka. The eastern necropolis is an urban necropolis of Remesiana, placed some 500 m southeast of the 4th-century fort, at the foothill of Veliko Kurilo and on the margin of the Nova Mala part of the modern-day town of Bela Palanka (Fig. 2). The necropolis is on higher ground (cca 320 m) than today's ground floor of the fort (cca 290 m). The inclination of the terrain where the necropolis was established is also visible.¹⁹ The first burials in the area were discovered in the second half of the 19th

³ For decades, only a few bioarchaeologists worked in Serbia. Now, the situation is completely different. The Laboratory of Bioarchaeology was established in 2008 and dozens of students and professionals trained there. At the same time, after years of conducting anthropological research, two other science centres were also established – the Center for Bone Biology at the Faculty of Medicine, Belgrade, and the Department of Bioarchaeology with Laboratory at the Institute of Archaeology Belgrade.

⁴ Vojvoda et al. 2021; Danković 2020; Danković, Marjanović 2022.

⁵ Petrović, Grbić 2013, 96.

⁶ So far, only P. Petrović has offered this kind of interpretation (Петровић 1979b, 180), where other researchers are more prone to explain the site at Jeleničevo as a *vila rustica* (Пејић 2015, 147).

⁷ Пејић 2015, 115–117.

⁸ Каниц 1985, Marsigli 1726, Tab. LXII.

⁹ Сабовљевић 1887, 91–99.

¹⁰ Сабовљевић 1888, 66–70.

¹¹ Мано Зиси, Поповић 1958, 353–354; Мано Зиси, Поповић 1959, 381.

¹² Гушић 1987; Gušić 1995.

¹³ Лазић и др. 2003; Ружић, Сладић 2013; Ружић, Цвијетић 2017; Ружић 2012; Ружић 2017; Цвијетић 2017; Лазић 2017.

¹⁴ Гушић 1987; Пејић 2015.

¹⁵ Ружић 2012, 357–358.

¹⁶ Petrović 1979a, 101–108; Петровић 1979b, 180–181; Petrović, Grbić 2013, 98.

¹⁷ Петровић 1979b, 180.

¹⁸ Јовановић 2004; Sorocanu 2008.

¹⁹ Јанковић, Михајловић, Бандовић 2021, 219; Јанковић, Михајловић, Бандовић 2023, 280–281.



Fig. 2. Position of eastern necropolis, aerial view with excavated areas (Photo: A. Bandović)

Сл. 2. Позиција источне некрополе, снимак из ваздуха са обележеним истраженим зонама (фото: А. Бандовић)

century, and in the meantime, more and more burials (simple graves, brick-built graves, and barrel-vaulted tombs) have been found and documented.²⁰ The first systematic excavation was conducted at this necropolis in 2014, when several partially preserved graves were found.²¹ However, the necropolis became a real focus for research in 2018, when the project “*Archaeological Research of Bela Palanka (Remesiana)*” was renewed.²²

Several types of burials have been discovered at the necropolis, and in most cases, the deceased were buried in simple dugout graves with no other material used for construction (Fig. 3a). The second group of graves are those constructed out of bricks (with several variants), sometimes with the use of stone for support (Fig. 3c). It is important to mention one case in which a tomb dug out of the soil and made out of bricks and stone was enclosed by a *memoria* – an object with almost quadrangular walls constructed in the drywall technique with a small entrance on the western side

²⁰ Каниц 1985, 201; Сабовљевић 1887, 97–99; Пејић 2015, 156.

²¹ The results of this campaign were never published. The archaeological team consisted of Marko Janković, Stevan Đuričić, Milan Savić, Jasmina Mladenović and Mira Ružić as coordinator. The team was present in Bela Palanka to conduct a revision excavation of Jelinićevo and we were informed by our colleague Zoran Mitić that people were building a house and found human remains. Excavations were short, lasting several days, and the graves were documented, but have not yet been published.

²² The project “*Archaeological Research of Bela Palanka (Remesiana)*” was renewed in 2018 with Marko Janković (University of Belgrade – Faculty of Philosophy) as coordinator and Gordana Jeremić (Institute of Archaeology, Belgrade) as consultant. The excavation team included Vladimir D. Mihajlović (University of Belgrade – Faculty of Philosophy), Aleksandar Bandović (National Museum of Serbia, Belgrade), Tamara Šarkiћ (University of Belgrade – Faculty of Medicine), Dimitrije Marković (University of Belgrade – Faculty of Philosophy), Petar Golubović (Archaeological Collection, Vuk Karadžić National Library, Bela Palanka) and a number of archaeology students, now mostly fellow colleagues (Nevena Marjanović, Predrag Đerković, Maša Bogojević, Nemanja Pavlović, Ana Gavrilović, Ana Ostojić, Duška Radosavljević, Nenad Andrić and Milan Marković).



Fig. 3. Types of burials discovered at eastern necropolis (2018–2023): a) burials in simple pits; b) burials in pits with above ground stone markings; c) brick-built graves; d) funerary objects – mensa type graves and e) brick tomb with memoria (Photos: M. Janković)

Сл. 3. Типови сахрана откритених на источној некрополи (2018–2023): а) слободно укојани гробови; б) слободно укојани гробови са кружним обележјима изнад гроба; в) гробови од опека; д) фунерарни објекти – mensa тип гроба и е) гробница од опека са меморијом (фото: М. Јанковић)



Fig. 4. Object 4, mensa type grave (G34) with child burial (Photo: M. Janković)

Сл. 4. Објекат 4, гроб типа mensa (Г34) са децом сахраном (фото: М. Јанковић)

(Fig. 3e).²³ In two cases, burials had simple, stone-made circular markings on the surface, a practice previously confirmed at the necropolises of Jagodin Mala and the site of Kladenčište. However, probably the most important finds at Remesiana's eastern necropolis are the graves of the *mensa* type – the graves were enclosed in “coffins” made of bricks and plastered on the inside, and walls in the shape of a horseshoe were erected above. In the middle of the western, straight wall, a smaller horseshoe-shaped surface was made from gravel and small stones, plaster or bricks (Fig. 3d, Fig. 4). It is assumed that those surfaces were used as platforms for wooden tables, used in the practice of “dining with the dead”.²⁴

New-born burials at the eastern necropolis

So far, 63 graves have been detected, 60 have been completely excavated, while graves G4, G6 and G63 have only been partially documented. Of the 60 excavated graves, three contained two burials (G9, 16 and G36), while in one, no remains were detected (G56). That leaves us with 60 graves but 62 buried

individuals. The important thing is that almost half of the total number (28) of buried individuals were children and juveniles (44%).²⁵ In two cases (G9 and G16), children were buried with the adults (possibly their parents), while in one case (G36), two children shared a single grave.²⁶

²³ The *memoria* was probably made for an adult buried in a tomb, but a few additions were made in a later period. First, the tomb was opened and a child was put inside the tomb (the bricks of the roof were removed and replaced with huge stones), and later another burial with two deceased (an adult and a child) were buried closer to the entrance (see Јанковић, Михајловић, Бандовић 2021).

²⁴ Јанковић, Михајловић, Бандовић 2021, 229; Јанковић, Михајловић, Бандовић 2023, 302.

²⁵ Thorough anthropological analyses are still ongoing. The skeletal remains from the eastern necropolis of Remesiana are being analysed by Tamara Šarkiћ, while samples for aDNA analysis were sent to the Department of Archaeogenetics Max Planck Institute for Evolutionary Anthropology, Leipzig. Once all the analyses are complete, we will be able to discuss it further.

²⁶ Јанковић, Михајловић, Бандовић 2021, 225–227; Јанковић, Михајловић, Бандовић 2023, 288–290.

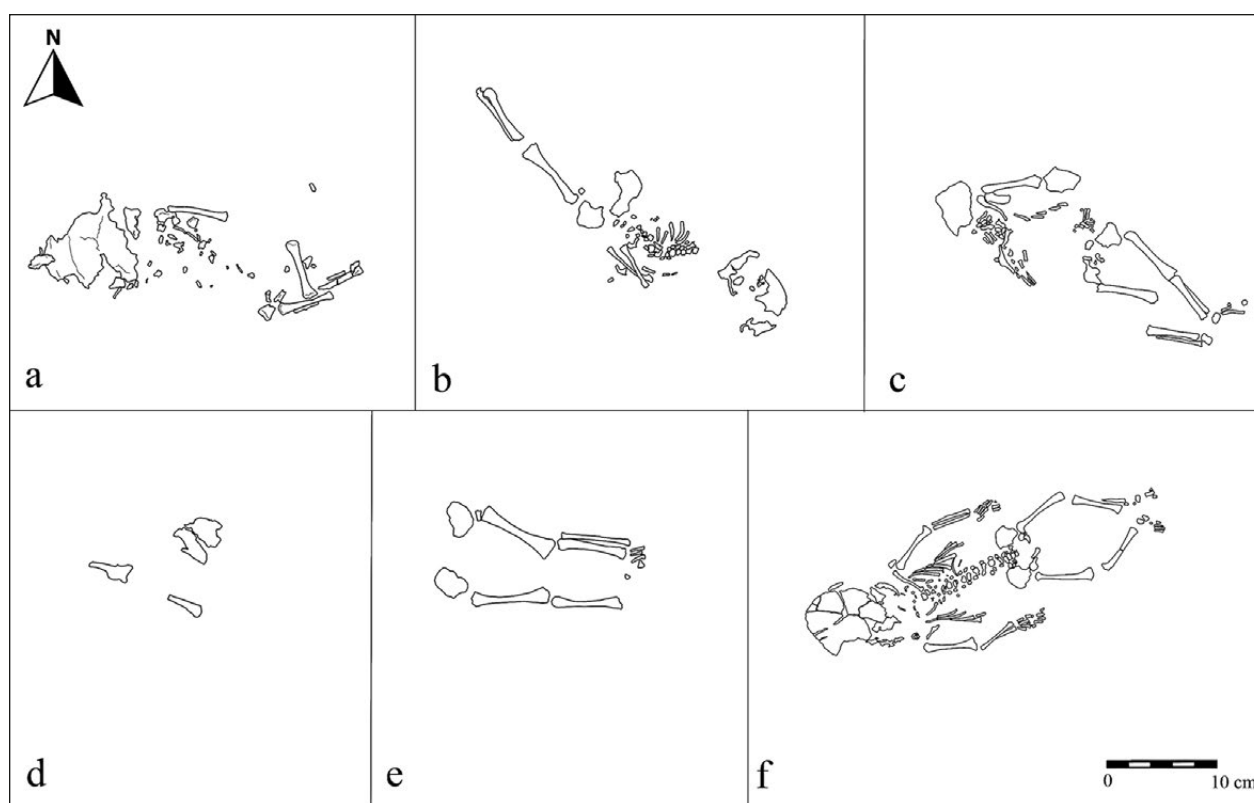


Fig. 5. Infant burials: a) G20, b) G23, c) G38, d) G39, e) G43 and f) G47 (Drawings: J. Premović)

Сл. 5. Сахране новорођенчади: а) G20, б) G23, с) G38, д) G39, е) G43 и ф) G47 (цртање: Ј. Премовић)

However, the main topic of this paper is graves belonging to the youngest of the deceased, those younger than six months. There are at least seven cases (G20, G23, G38, G39, G42, G43 and G47) in which human remains of new-borns were found (Fig. 5). Besides these, we also documented two more cases in which only a few bones were found in no clear context, so it is not clear whether those bones were part of some already documented graves or of some other, completely dislocated ones. For example, in one case, fragments of a new-born's skull, teeth and ribs were found, all dislocated and some 0.5 m from each other, but also in the relative vicinity of graves G38, G39, G42 and G47, while in other cases fragmented ribs, teeth, a scapula and vertebra were found in a similar condition, but this time close to grave G43. Since we cannot be sure where these bones belong, we will focus on those cases where the bones were found at least partially intact.

When addressing age categories of children in anthropology, it is important to emphasise that the classification of age groups is not methodologically

standardised and often does not correspond to the socio-cultural context or related social constructs.²⁷ The bioanthropological analysis of the skeletons from Remesiana was conducted according to the life history model, which defines the following categories for children and juveniles: Infancy (from birth to three years of age), Early Childhood, Late Childhood, and Adolescence. Since this study focuses on the Infancy category, and in particular, on new-borns up to six months of age, the term will be applied specifically to the skeletal remains of children up to six months of age.

Grave 20 (Fig. 5a, Fig. 7)

The remains found in the grave were partially preserved, mainly bones of the skull and extremities, while the ribs and vertebrae were absent. The orientation of the grave is W–E, with the head to the west. The skeleton was in a supine position, and the length of the preserved remains was 0.30 m. Since the skeleton

²⁷ Roksandic, Armstrong 2011, 337–347.

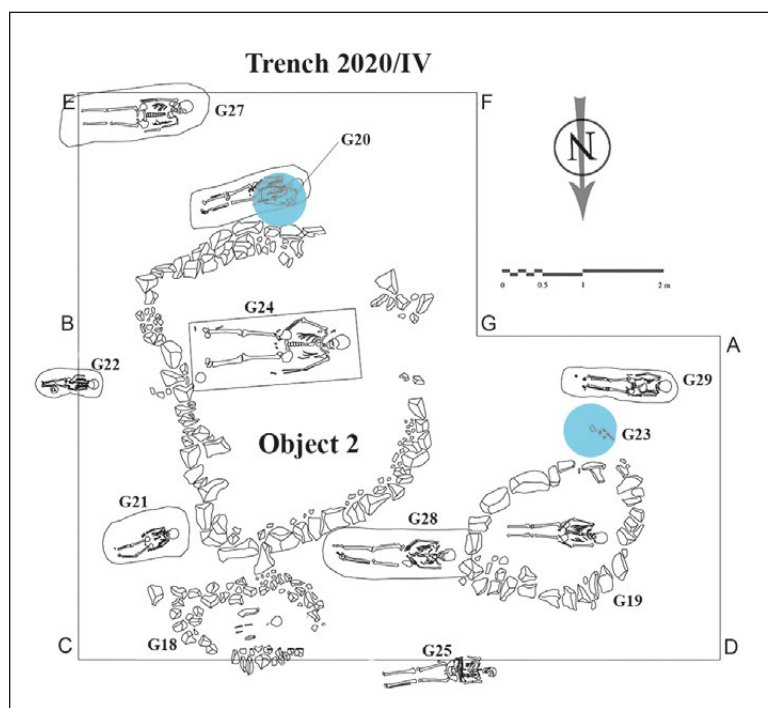


Fig. 6. Top cover made of a single brick and a stone, G20 (Photo: M. Janković)

Fig. 7. Plan of trench 2020/IV with positions of infant burials in G20 and G23 (Drawings: M. Janković)

Сл. 6. Кров гроба конструиран од ојке и камена, Г20 (фото: М. Јанковић)

Сл. 7. План сонде 2020/IV са обележеним сахранама новорођенчади Г20 и Г23 (цртеж: М. Јанковић)

was in fairly poor condition, we can assume that some bones disintegrated in the soil long before the excavation. Interestingly, the bones were covered with a brick tile (dim. 0.29 x 0.25 x 0.05 m) and stones, forming a roof above the grave (Fig. 6). There were no traces of a coffin and no grave goods were found beside the body. Interestingly, the grave of the adult person in G26 was placed directly above G20 (Fig. 7), with a slight elevation difference of approximately 0.45 m. In G26, a bronze coin was found, among other things. The coin was minted between 330 and 333 AD, during the period in which Constantinus II was Caesar, so 333 AD should be *terminus post quem* for the G26.²⁸ That means that the deceased's burial in G20 must have taken place only in 333 AD or after.

Grave 23 (Fig. 5b, Fig. 7)

This grave was discovered just beneath the southern edge of the stone ring marking of grave G19 (Fig. 7). Most of the bones were present and in their anatomical positions, except in the case of the left arm, for which no bones were found. The skeleton was ori-

ented NW–SE, with the head to the SE and slightly turned on its left side. The skull was at a lower point than the rest of the remains, so it is possible that the body was wrapped in some linen or inside a linen bag. The length of the preserved remains is 0.40 m. There were no signs of a wooden coffin or inventory in the grave. However, above part of the grave there was a concentration of small stones, which could be interpreted as some cover of the grave, but it is more probable that those stones came from the bottom of the grave and were turned up during the burial.

Grave 38 (Fig. 5c, Fig. 8)

Grave G38 was discovered close to the similar new-born grave G39. Both graves were found just between two others – one with the adult individuals in

²⁸ Constantius II (RIC VII, p. 524, no. 184, mint of Thessalonica, date 330–333 AD). The date of the coin and mint attribution previously published in a report (Јанковић, Михајловић, Бандовић 2021, 234) was wrong due to the state of the coin preservation, and I now stand corrected.

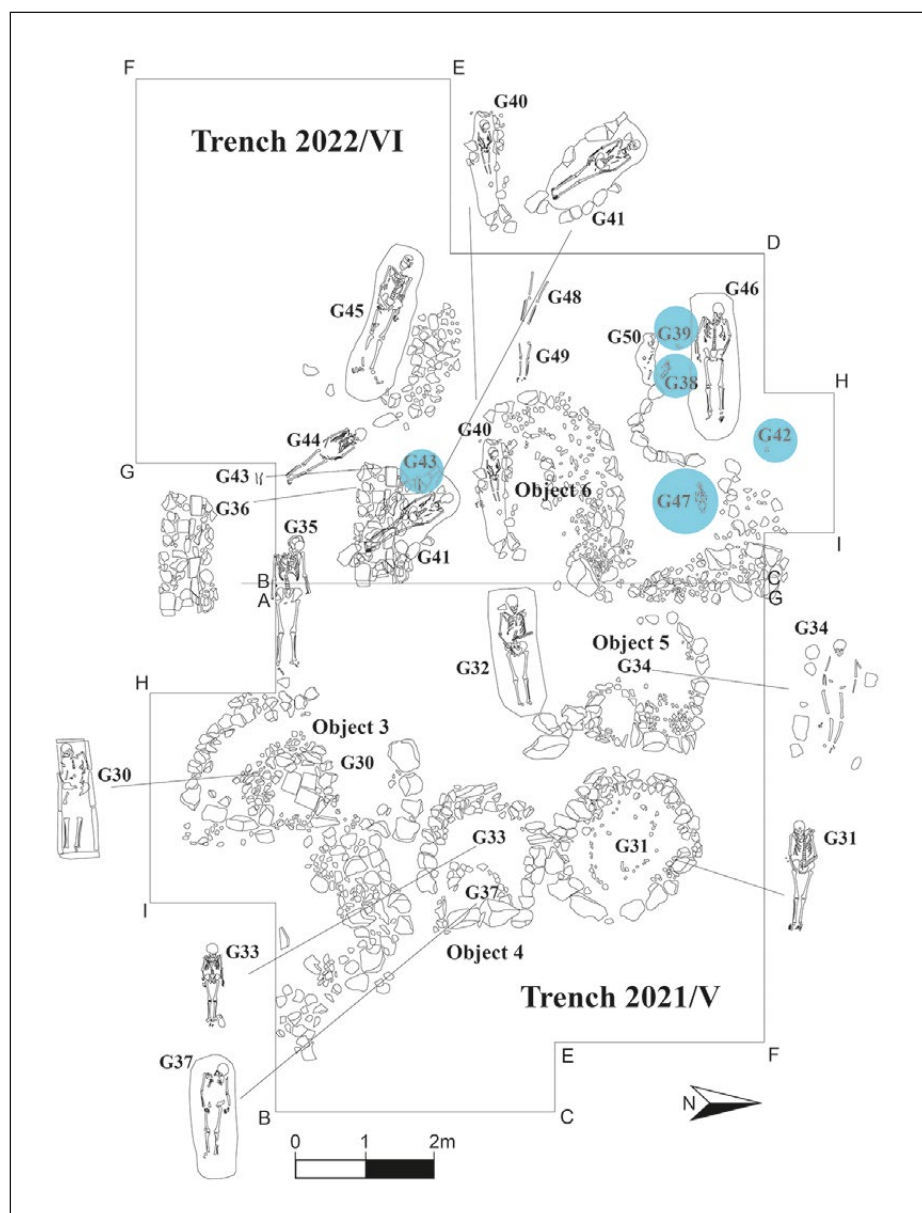


Fig. 8. Plan of trenches 2021/V and 2022/VI, with positions of infant burials G38, G39, G42, G43 and G47 (Drawings: M. Janković)

Сл. 8. План сонди 2021/V и 2022/VI са обележеним сахранама новорођенчади Г38, Г39, Г42, Г43 и Г47 (цртеж: М. Јанковић)

G46, and the other, probably a juvenile, in G50 (Fig. 8). Most of the bones in G38 were present (except the skull) and mostly in an anatomical position, so it was possible to determine the length of the skeleton – 0.20 m. However, the bones were in a bad condition, probably due to soil acidity and chemical processes. The skeleton was oriented NW–SE, with the head to the NW. There were no traces of a coffin or markings above the grave or any other objects in the grave.

Grave 39 (Fig. 5d, Fig. 8)

The skeleton in G39 was completely dislocated, so it was not possible to determine the length or any other dimension of the deceased. The grave is relatively close to G38, just 1 m to the west (Fig. 8). The bones were scattered on and around a stone; it was not clear whether it was part of the grave or just part of the content of the soil. Similar to previous cases, there were no traces of grave goods, a coffin or markings.

Grave 42 (Fig. 8)

The bones discovered in G42 were mostly dislocated and poorly preserved, but the orientation of the grave is visible – W–E, with the head of the new-born to the west. The remains were found beneath and beside the place where iron nails were found, so we can assume that the deceased was placed within a coffin. However, no other grave goods or traces of markings were found. The grave was almost completely devastated during the excavation process.

Grave 43 (Fig. 5e, Fig. 8)

The remains in grave G43 were partially dislocated by the late Roman activities and again partially dislocated during the excavation. Some of the bones were found scattered in the soil, together with a humerus, which was positioned vertically, and only the lower extremities were found anatomically intact. The preserved remains are 0.14 m long. The skeleton was oriented W–E, with the head to the east. Similar to the skull of grave G23, the pelvic bones here were found at a lower point (by some 0.05 m) than the leg bones, so it is possible that the body was placed in a linen bag during the burial. The burial of G43 occurred after the burials of G41 and G36, which were stacked one on top of the other (Fig. 8). G36 is some 0.80 m below G41, but since there were no coins found within, we could only date it generally to the 4th century (by the glass cup). Luckily, G41 was literally on top of G36 (even partially destroying bricks from its roof), which could be dated more precisely, due to the 14 coins found inside of G36. The coins were minted between 318 and 328 AD and belonged to Licinius I (1),²⁹ Licinius II (1),³⁰ Constantine the Great (8),³¹ Constantine II (3)³² and Helena (1).³³ The oldest coin was minted for Licinius II between 318 and 320 AD, and the youngest specimens are those of Constantine II and Helena minted between 326 and 328. At the same time, the year 328 represents the *terminus post quem* for the burial in G36.

Grave 47 (Fig. 5f, Fig. 8–9)

This grave is the best preserved case among all others (Fig. 8–9). The skeleton was found in an anatomically correct position, placed on its back with the arms beside the body. The orientation of the skeleton is SW–NE, with the head turned to the southwest. The length of the remains is 0.40 m, and most of the bones were present and in good condition. However, no sign of a coffin or markings of the grave were found, and there were no grave goods placed with the new-born.

According to available data, we can define some main common features for all the graves. First of all, most of the bodies were buried in a relatively shallow pit, in comparison to other graves of adults and sub-adults. The graves of new-borns had no above-ground markings or signs, which probably resulted in a great deal of devastation when digging younger graves, and most of them were simply lowered into the ground, possibly wrapped in linen or placed in linen bags. The only trace of any construction or effort to protect the body was found in G20 – the brick and stone construction of the roof (Fig. 6). Except in one case, where some iron nails were found (G42), there were no traces of wooden coffins. Interestingly, four out of seven graves were placed close to each other (G38, G39, G42 and G47), so it is possible that all of them were buried over a relatively short period, while the memory of the location of the burials was still fresh and known among the community. The age range of the buried individuals ranges from a few days old (or maybe even stillborn) to only a couple of months.³⁴ It is also an interesting fact that not a single object was found within these seven new-born burials, which is striking in comparison with other graves at the necropolis.³⁵

Generally, such findings would not draw much attention at some of the Late Roman sites, but the situation is completely different at the eastern necropolis, so when we observe these cases within the broader archaeological context of the necropolis, it is clear

²⁹ Licinius I (RIC VII, p. 510, no. 102, mint of Thessalonica, dated to 320 AD).

³⁰ Licinius II (RIC VII, p. 546, no. 31, mint of Heraclea, dated to 318–320 AD).

³¹ Constantine I (RIC VII, p. 615, no. 90, Mint of Nicomedia, dated to 324–325 AD (2 coins); RIC VII, p. 444, no. 159, Mint of Siscia, dated to 320–321 AD; RIC VII, p. 647, no. 24, Mint of Cyzikus, dated to 324–325 AD (3 coins); RIC VII, p. 519, no. 159, Mint of Thessalonica, dated to 326–328 AD (2 coins).

³² Constantine II (RIC VII, p. 549, no. 61, Mint of Heraclea, dated to 324 AD (2 coins); RIC VII, p. 519, no. 157, Mint of Thessalonica, dated to 326–328 AD).

³³ Helena (RIC VII, p. 519, no. 159, Mint of Thessalonica, dated to 326–328 AD).

³⁴ For children, skeletal age estimation was carried out using epiphyseal fusion, diaphyseal length measurements, dental development, and tooth eruption, in accordance with established anthropological standards (Brothwell 1981; Maresh 1943; Scheuer, Black 2000). Following the primary age assessment, the data were subsequently classified within the framework of the life history model (Roksandic, Armstrong 2011).

³⁵ Јанковић, Михајловић, Бандовић 2021, 233–242; Јанковић, Михајловић, Бандовић 2023, 292–301.



Fig. 9. Infant burial G47 (Photo: M. Janković)

Сл. 9. Сахрана новорођенчета из Г47
(фото: М. Јанковић)

that they deserve special attention to understand the processes in the Late Roman society of Remesiana. First of all, there are no less than 21 burials of children and juveniles, whose graves look very different.

Secondly, the grave construction was far more differentiated. Some of the graves were simple pits (11), while for some of them, bricks were used (9). Furthermore, some of the children's/juvenile's graves were placed within larger funerary objects – G16 was in a brick tomb enclosed with *memoria* walls, G33 was inside a *mensa* type grave (Object 4), as was G56, which, despite the absence of skeletal remains, was placed inside another *mensa* type grave, labelled as Object 7.³⁶ In both burials in *mensa* graves, we can also assume wooden coffins, as a result of the discovered iron nails within the graves (G33 and G56). However, the most striking difference between the graves of new-borns and those of other sub-adults is the presence of grave goods and other items within the graves of other sub-adults. There are only two cases where nothing was found (G18, G21), while the situation is quite different in the rest of the graves. Most of the

objects are usual inventory – jewellery, parts of clothing accessories, ceramic vessels, and coins. While most of them were common (like bronze and glass bracelets and earrings, glass beads, ceramic vessels and bronze coins), it is important to outline that some of the items found in children's and juvenile's graves are relatively rare and expensive. The most extreme case was G16, where an adult and a child were buried together in a brick tomb enclosed by *memoria*.³⁷ However, objects found with the child were a silver fibula and a very rare silver *miliarensis* of Constantius II, minted in Siscia between 337 and 340 (RIC VIII, p. 353, no. 48).³⁸ On the other hand, while most of the burials had one or two objects with them, G36 (Fig. 8), two children buried together had 14 bronze coins (10 of them inside a leather bag), a small bronze bell (still placed in one of the hands) and a ceramic jug.³⁹

Marginalised in death: the youngest as social outcasts?

Traditionally, Remesiana is perceived as an important early Christian centre within the province of Dacia Mediterranea.⁴⁰ The city thrived in the 4th century, which was a tumultuous period, to say the least. The Roman Empire was transformed, in administrative, military, economic, social, and other ways, at the end of the 3rd and the beginning of the 4th century. Furthermore, and most importantly (on this occasion at least), this was the period when Christianity slowly became the dominant religion within the empire, and the church became a more central and institutionalised organisation.⁴¹ Starting with the Edict of Milan in 313 AD, then to Theodosius' proclamation of Christianity as a state religion, this institutionalisation continued long into the early Middle Ages, when several Christian councils were held to set the rules and organization of the church and its beliefs.⁴²

Still, Remesiana cannot be perceived as a solely Christian community. It is just too much to expect that

³⁶ Јанковић, Михајловић, Бандовић 2023, 287–288; Јанковић, Михајловић, Бандовић 2025, 220–224.

³⁷ Јанковић, Михајловић, Бандовић 2021, 225–227.

³⁸ Crnobrnja, Janković 2023, 115–129.

³⁹ Јанковић, Михајловић, Бандовић 2023, 289–290; Crnobrnja, Janković 2023, 116. Cf. *supra* ref. 27–31.

⁴⁰ Petrović 1979a, 52–57; Janković 2021, 170.

⁴¹ See Popović 1993, 253; Ferjančić 2013, 27; Jeremić, Ilić 2018, 198; Janković 2021, 166.

⁴² Popović 2013, 157.

the people of Remesiana accepted the new religion overnight and started practising it all at the same time. It is much more reasonable to expect that different religious groups had to maintain new social dynamics between them daily.⁴³ For starters, texts concerning Nicetas of Remesiana all agree that he was there as a missionary to entice the local Thracian population to become devoted Christians,⁴⁴ which means that at least some of them were not practicing Christianity at the time. Furthermore, although rare, some of the finds from Remesiana, like the Hercules icon,⁴⁵ statues of Mars and Venus,⁴⁶ etc., show us that we can expect different religious groups within the same community. Even some burials from the eastern necropolis could be construed as “pagan” – different orientations of the graves,⁴⁷ the prone burial of a woman,⁴⁸ the bronze bell in one of the children’s graves.⁴⁹ Of course, all these parameters could be interpreted as Christian ones, just like in cases where customs survived the transition from the Roman pagan period to the Christian world. Such customs could be seen at the eastern necropolis – putting a coin inside the deceased’s mouth (G37) or putting different vessels inside the grave (G46). In the first case, it is about the traditional Greco-Roman custom to ensure that the deceased has a coin to pay for the underworld passage. However, the custom survived long into the Middle Ages, and such cases are also known from different medieval necropolises.⁵⁰ The cases similar to G46 are also usually explained as traditional liquid offerings for the dead.⁵¹

At the same time, there are clear signs of a Christian presence at the necropolis. First, *mensa* graves are usually explained as a burial type connected to Christians,⁵² while one of the graves (G14) had a cross incised on the brick (Fig. 10).⁵³ More detailed analyses of the necropolis led us to believe we can recognise both pagan and Christian features.⁵⁴ However, we should be aware that the strict separation of a pagan and a Christian burial is almost impossible on an individual level.

So, with all that has been previously said, we will try to explain these seven cases of new-born burials. In our case, most of the burials had no obvious coffin or grave construction, except for G23, where brick and stone were used to cover the grave. All of the graves are relatively shallow in comparison to other, more mature deceased, and not a single object has been found within them. However, that should not be perceived as a lack of care for dead new-borns. Researchers dealing with a great number of children’s



Fig. 10. G14, burial of an older woman with a cross incised in a brick (Photo: M. Janković)

Сл. 10. Г14, сахрана старије жене са крстом урезаним у ојеку (фото: М. Јанковић)

⁴³ Janković 2021, 177.

⁴⁴ Јовановић 2008, 55, Petrović, Grbić 2013, 98.

⁴⁵ Gavrilović Vitas 2020, 242.

⁴⁶ Војнић, Пејић 1983, кат. бр. 61–62.

⁴⁷ Some of the graves (like G2) was oriented north-south, within a brick surround, with slightly bent legs. No grave goods were found within it.

⁴⁸ Јанковић, Михајловић, Бандовић 2021, 232–233.

⁴⁹ Јанковић, Михајловић, Бандовић 2023, 300–301.

⁵⁰ Е.г., Љубинковић-Поровић 1958, 372; Бајаловић-Бирташевић 1960, 14; Радичевић 2007, 190.

⁵¹ Јеремић 2014, 54.

⁵² These types of graves are usually perceived as Christian ones in the Late Roman period, most likely as a continuation of earlier, pagan traditions in changed, Christian circumstances (Jensen 2008, 107–143; Dunbabin 2010, 175–191; Јанковић, Михајловић, Бандовић 2023, 302; Ardeleanu 2024, 145–162).

⁵³ Janković 2022, 978.

⁵⁴ Janković 2021, 163–181.

burials at Viminacium showed that, in most cases, new-borns were buried without grave goods, unlike the children of older categories, who were buried with different objects. Such a division was explained by the circumstance that the period of 6 months of age is a period of tooth growth and a change in diet.⁵⁵ Still, the situation at Viminacium, where most new-born burials have been dated to the period of the 1st–3rd century AD, shows that more than 40% of new-borns were buried with grave goods.⁵⁶

The decision to bury new-borns at the necropolis and not to deal with them in any other way leads us to the conclusion that some social norms, defined by the community, were present in the process. In the Early Roman period, the situation was different – sometimes, new-borns were buried not at a place designated for burial but often within the buildings and settlements in general (so-called eaves-drip burials),⁵⁷ and sometimes they were completely absent from the necropolises. Their absence could be explained in numerous ways – their shallow, unmarked graves were often devastated while burying other people at the necropolis, the methodology of excavations could result in the remains being overlooked and, finally, working with old archaeological evidence could also result in incomplete documentation. Some scholars have even suggested that these circumstances imply that burials were Christian and that with the arrival of Christianity, more attention was focused on the dead.⁵⁸ Still, such assumptions are rarely based on hard data and analyses and lack basic arguments.⁵⁹

Late Roman new-born burials in the territory of Serbia and neighbouring regions

The different treatment of the bodies of new-borns at the necropolis could be tied to specific social norms of the Roman world, where very young persons were not considered full members of the community. Romans (and their laws) differentiated children before and after their naming. Namely, the first eight/nine days of life were perceived as crucial for survival and were called *dies lustricus*. Only after that period was the child named and recognized as a member of the community.⁶⁰ Furthermore, only after the age of one year could children be officially and publicly mourned, which was not the case when they were younger than that.⁶¹ Still, when it comes to the Early Roman period in the territory of Serbia, the burial customs of new-borns were much different. The case of Viminacium's southern necropolis (1st–3rd centuries AD) shows us

that in 76 cases of confirmed new-born burials, almost 40% had some kind of object with them.⁶² Some of them were buried in simple pits, but some were buried in amphorae, and many had wooden coffins.⁶³

On the other hand, we have no detailed data on Late Roman necropolises in Serbia. In some cases, bioarchaeological data was never published or was published without an archaeological context. Most of the publications are focused on burial types and cataloguing grave goods, while data concerning osteological remains is either completely absent or very rudimentary.⁶⁴ While searching for analogies concerning new-born burials in Serbia, we found just a few examples where the data was precise and complete enough that we could discuss the burial customs. Naturally, we started at the geographically closest necropolises, then moved further away. The closest necropolis where we could draw an analogy was Gladno Polje, just 2 km north of the eastern necropolis. At least two cases of new-born burials were confirmed, and both times the new-borns were buried together with adults. In one of the cases, the new-born was buried with an adult and with a glass bead necklace.⁶⁵ Outside of Remesiana, the closest Late Roman necropolises are those in Jagodin Mala (Naissus)⁶⁶ and Slog-Ravna (Timacum minus).⁶⁷ In the case of Jagodin Mala, we only have bioarchaeological data published as a part of a dissertation, while the archaeological perspective was given separately.⁶⁸ Consequently, we were able to obtain only a small piece of information – there is at least one new-born

⁵⁵ Vojvoda, Golubović, Mikić 2021, 140. Similar patterns were observed at the necropolis of Salleles d'Aude (Dasen 2003, 288; Dasen 2009, 210), and at other necropolises in Italy (Carroll 2011, 108, fn.55).

⁵⁶ Vojvoda, Golubović, Mikić 2021, 141, fn.308.

⁵⁷ Pearce 2001, 127; Carroll 2018, 157–165.

⁵⁸ Watts 1989, 378; Pearce 2001, 128.

⁵⁹ Vojvoda, Golubović, Mikić 2021, 141–142.

⁶⁰ Corbier 2001, 55; Carroll 2018, 63.

⁶¹ Carroll 2018, 65.

⁶² Vojvoda, Golubović, Mikić 2021, 146.

⁶³ Vojvoda, Golubović, Mikić 2021.

⁶⁴ Јерemiћ 2014; Дмитровић, Радичевић 2009; Marijanski-Manojlović 1987.

⁶⁵ Ружић 2017, 220.

⁶⁶ Јерemiћ 2014.

⁶⁷ Petković et al. 2005.

⁶⁸ This is only a part of the Jagodin Mala necropolis, excavated within the perimeter of the Benetton factory in Niš. For older excavations we have no information concerning the osteological remains, neither age nor sex.

burial at the necropolis, but the conditions of its discovery are unknown.⁶⁹ At least four more cases have been confirmed at the Slog-Ravna Roman necropolis – one (G10) is buried in a shallow simple pit with no grave goods, the other (G19) is buried in a simple pit but with jewellery (earrings, necklace and bronze bracelet). The third case is interesting (G30) since it is a dual burial with a new-born having no grave goods and a child with a necklace, a bronze pin and a tube. The last new-born (G64) from this necropolis is buried with a glass bead necklace and a glass toiletry bottle.⁷⁰

The biggest database concerning burials in the territory of Serbia belongs to the site of Viminacium, where more than 10,000 graves have been excavated so far, dating from the 1st to the 5th century AD.⁷¹ However, besides the detailed catalogues of grave goods, the information on skeletal remains is usually scarce. In a recent publication on coins in apotropaic elements in the burials of Viminacium's southern necropolis,⁷² the authors mention 341 burials (221 with grave goods and 120 without) of new-borns. Yet, only six of them could be dated to the 4th century AD, four from the Više Grobalja necropolis (G-2077, G-2082, G-2088, G-2092)⁷³ and two from the necropolis of Pećine (G-4419, G-1298). All four graves from Više Grobalja and G-1298 from Pećine were built in simple pits, while the Pećine G-4419 grave was brick-built. Also, all Viminacium burials, except G-4419, contained grave goods.

At the bi-ritual necropolis in Čačak, we have no information about such burials, except the necropolis plan that could imply that some of the graves of children were maybe inhumed burials.⁷⁴ It is similar to the Late Roman necropolis in Beška, where bioarchaeological data was reduced to basic information.⁷⁵ The last example relates to a part of the eastern necropolis of Sirmium, where 12 burials with 40 inhumed individuals were discovered in 2016. While archaeological observations were separated from bioarchaeological ones in publication, it is still possible to obtain a good insight. There were at least six new-born burials, which make up 50% of all child and juvenile burials at the necropolis (and 15% of the total number of deceased). Some of them were buried with multiple individuals – four in Tomb 16 and even nine in Tomb 20.⁷⁶ In both cases, new-borns were placed inside brick-built tombs, plastered and fresco-decorated on the inside.⁷⁷ Furthermore, the frescos in tomb 20 have clear Christian motifs.⁷⁸ Although we cannot say to which

person the grave goods belonged, bronze coins and glass goblets were found in both tombs, together with some animal bones.

The situation in neighbouring countries is very similar to that in Serbia when it comes to the burials of the new-borns. The inconsistency between the archaeological and bioarchaeological data is very noticeable. Older publications (until the end of the 20th century) usually excluded anthropological analyses or presented them in very rudimentary form. On the other hand, those from the past two decades insisted on bioarchaeological data and rarely concerned themselves with the details of archaeological contexts.

Burials of the Late Roman period were rarely excavated in the Croatian part of Pannonia, and most of them were dated to the 4th century. Apart from Cibale (Vinkovci), a greater number of burials have been investigated at the sites of Tekić, Ad Novas (Zmajevac) and Štrbinci.⁷⁹ Burials of new-borns were confirmed at several necropolises in northern Croatia – Ad Novas (Zmajevac), Mursa (Osijek), Cibale (Vinkovci) and Štrbinci.⁸⁰ Three cases were confirmed at Zmajevac, while a total of three others were confirmed at Osijek, Vinkovci and Štrbinci.⁸¹ Still, since we have no information on the circumstances of their burials or even pieces of archaeological context, we cannot further discuss burial customs.

⁶⁹ Vulović 2020, 171.

⁷⁰ Petković et al. 2005, 25–46.

⁷¹ Of the 10,267 burials excavated at the Pećine and Više Grobalja sites, 1,828 of them belonged to children (Vojvoda, Golubović, Mikić 2021, 10).

⁷² Vojvoda, Golubović, Mikić 2021.

⁷³ All four burials were dated indirectly, connecting them with nearby graves dated to the 4th century (Vojvoda, Golubović, Mikić 2021, 200, T. I.1 – cat. no. 115–118).

⁷⁴ In only 20 out of 81 burials at the necropolis has inhumation been confirmed. There is no information on their sex or age (Дмитровић, Радичевић 2009; Radičević, Dmitrović 2017, 227).

⁷⁵ E.g., Marijanski-Manojlović 1987.

⁷⁶ Miladinović-Radmilović 2022, 91; 96.

⁷⁷ Lučić 2022, 30–31; 35–37.

⁷⁸ Vujović 2022, 43–55.

⁷⁹ Leleković 2012, 342.

⁸⁰ Šlaus, Pećina-Šlaus, Brkić 2004, 240–263.

⁸¹ Šlaus, Pećina-Šlaus, Brkić 2004, 246. The authors combined the three different sites of Osijek, Vinkovci and Štrbinci to create a non-limes database (versus the limes database of Zmajevac), so all data was given together. However, in Vyrubal, Perić Peručić, Šlaus 2013, 327, different information is given – two new-borns at Vinkovci and two more at the Štrbinci necropolis.

The situation in Hungary is different, at least when it comes to the number of detected burials. The highest number of children younger than one year were confirmed at the early Christian necropolis of Sopianae (Pécs). In a specific area of the necropolis, west of Object XIII, a children's cemetery was discovered, with 61 child burials.⁸² In 14 burials, children younger than one year were confirmed. However, we have no information on the burial type or the existence of grave goods in those specific burials. The only information we have at our disposal is that children's graves (altogether) were rich in glass finds.⁸³ At the western necropolis of Aquincum (Budapest), five new-borns were discovered, but two of them are from the 2nd and 3rd century AD, while three of them are undetermined. Only the burial from the 2nd century contained grave goods (burial no. 101), while none have been discovered in the rest of them (burials nos. 135, 158, 171 and 180). The 2nd-century burial (burial no. 101) was the grave of a cremated adult, while the others were placed in simple pits. Only the new-born burial in grave no. 135 had a stone slab as a cover for the grave.⁸⁴ At the necropolis in Keszthely-Fenékpuszta, one more new-born's grave was found (1971/68). The new-born was buried in the grave of a previously deceased child. There were no grave goods within the burial, and both bodies were found within a simple pit.⁸⁵ One more new-born burial at the cemetery of Sárvár was confirmed, but again with no further information on archaeological context.⁸⁶

The Late Roman necropolis (4th–6th century AD) at Ibida (Slava Rusă) in modern-day Romania has been excavated for decades, and at least six new-born burials have been found – five new-borns (M23, M25B, M29B, M31 and M145) and one of 9 months old (M34). Two of the new-borns (M25B and M29B) were buried together with older women.⁸⁷ The new-borns buried in M23 and M145 were not buried at the cemetery, but below the foundation of a dismantled wall (M23) and at the SE corner of a defensive wall tower (M145).⁸⁸ Interestingly, the body of a new-born in M23 was covered with fragments of a large storage vessel. The only burial with any object within the grave was M34, where an unidentified iron object was found. Another case of a burial with a new-born child was documented at Halmyris (Murighiol). Namely, in the crypt of the episcopal basilica, the remains of an adult, two children and a new-born were discovered. However, the bodies were probably placed in the crypt only after the basilica had been abandoned.⁸⁹ During the excava-

tions conducted between 2012 and 2021, 34 graves were unearthed in the southern necropolis of Histria (Istria). Among them, five new-borns were documented (G8/2012, 9/2012, 20/2017, 26/2017 and 30/2018).⁹⁰ All five burials were made as simple pits with a single row of tiles used for the roof. However, graves 20/2017 and 26/2017 had lids near the feet of the deceased. built with bricks and stones, and were strengthened with fragments of bricks and stone on the sides. Near the extra-muros basilica in Histria, two additional new-born burials were documented in previous excavations – grave 69 and grave 20/2010. The new-born from grave 69 was interred in an amphora, while the situation with grave 20/2010 was somewhat different. The body was placed on a tile, and shards of an amphora were placed above it. Smaller fragments of tiles were arranged around the pieces of the amphora.⁹¹ None of the burials contained any grave goods, and they are dated, together with the rest of the burials, to the 4th–5th century AD. A similar burial was also found in Tomb M208 at the Roman-Byzantine necropolis of Callatis. Pieces of two amphorae were placed upon the remains of a new-born in a simple pit grave.⁹²

Information on new-born burials in Bulgaria is much different. Despite the large number of excavated necropolises of the Late Roman period, we do not have the precise age of the buried persons most of the time. The exception is the necropolis of Benkovci, on the periphery of Sofia (Serдика), where four burials of new-borns were discovered. Three of them (graves nos. 10, 11 and 16) were under 6 months old and placed in a simple pit with the roof made of bricks, while grave no. 71 contained an individual of around 1 year old, buried in a simple pit.⁹³ The only grave that contained any grave goods was grave no. 11, where two iron arrow tips were found.⁹⁴

⁸² Fülep 1984, 176.

⁸³ Fülep 1984, 176.

⁸⁴ Topál 1993, 7–76.

⁸⁵ Müller 2010, 74.

⁸⁶ Tóth, Merczi 2010, 168.

⁸⁷ Soficaru et al. 2004, 329.

⁸⁸ Crețu 2023, 102–103.

⁸⁹ Achim 2012, 187.

⁹⁰ Crețu, Dabîca, Soficaru 2020, 174–181.

⁹¹ Rusu-Bolindet et al. 2014, 204–205; Crețu, Dabîca, Soficaru 2020, 146.

⁹² Preda 1980, 21.

⁹³ Динчев 2024а, 239–268.

⁹⁴ Динчев 2024б, 66, Т. В, с.л.16.

This short review shows that the situation with new-born burials greatly differs from one site to another or, in some cases, even within the same site. Besides Remesiana, there are 64 more cases of new-born burials documented in this paper. Unfortunately, we do not have all the facts about the majority of them, mostly because they have never been published. When it comes to burial types, we can discuss only 33 cases (51.5 %) where that kind of information is known. The most numerous burials are those of simple pits, with 14 confirmed cases (Više Grobalja/Viminacium 4, Ravna-Slog 4, Aquincum 3, Benkovci/Serdica 1, Pećine/Viminacium 1 and Keszthely-Fenékpuszta 1). Eight more cases of simple pits, but with roofs made of brick tiles, have been found in Histria (5) and Benkovci/Serdica (3). Brick-built graves for new-borns were discovered in Pećine (1) and Sirmium (2). Probably the most interesting group of burials comes from the sites in Romania, where new-borns were buried in amphorae or covered with amphora fragments – Histria (2), Ibida (1) and Callatis (1). Of course, there is one more burial type confirmed in a single case – a case of a burial in a crypt in Halmyris.

A similar situation is with the presence of grave goods within burials. There is a large number of graves, 25 graves or 39% of the total number, with no objects placed with the deceased. Only 10 graves (16 %), from six different sites, contained any grave goods, mostly jewellery, glass vessels and arrow tips. It is interesting that at five out of six sites, both burials with and without grave goods have been confirmed (Ibida, Benkovci/Serdica, Slog-Ravna, Pećine and Gladno polje). However, the greatest number of burials, 29 of them (45%), are without any information about the grave goods, so we have to accept these numbers with caution.

Although most new-borns were buried alone in the graves, there are some examples of dual or multiple burials. At the necropolises of Gladno Polje in Remesiana and in Histria, there were two graves at each necropolis where new-borns were buried together with adults. At the Histria necropolis, both adults were determined as women,⁹⁵ while there is no information about the sex of the adults at Gladno Polje. At the Christian necropolis of Sirmium, 4 and 9 people were buried within two tombs, while 4 more people were discovered in the crypt of the basilica in Halmyris.

Examples from Remesiana show similarity with some of the previously described burials from Serbia and neighbouring regions. New-borns from Remesiana were buried alone in simple pits, just like the most nu-

merous group of new-borns and with no grave goods, again similar to the greater number of those for which we have information. The only difference in Remesiana is that they show (for now) more uniformity than at other necropolises, where different burial types are documented at the same sites or new-borns may or may not have grave goods.

Conclusions

A short survey of published Late Roman necropolises shows just a few examples of documented new-born burials in the territory of Serbia and neighbouring regions. It is more than possible that many factors contributed to this – the state of old evidence from previous excavations with no original data preserved, but also the “invisibility” of such cases during excavation could lead to their destruction either by people burying them in the 4th century or by archaeologists hurrying to get the excavations done within expected deadlines. Greater care in future research could help prevent mistakes and the overlooking of such contexts. On the other hand, Late Roman necropolises are generally rarely published completely, and bioarchaeological analyses are often excluded or published separately. The same survey revealed that new-born burials, when documented, were diverse, ranging from empty single burials to lavishly decorated Christian tombs with multiple individuals, with or without grave goods and within different types of graves. While examples from the neighbouring regions show more diversity, the cases from Remesiana are more uniform. Except for one grave (G20), where a single brick was used as a roof cover, the rest of the burials are almost identical. However, examples from the region show that it was common for new-borns to be buried differently at the same necropolis, either when it comes to the type of burial (Benkovci/Serdica, Histria and Slog-Ravna), the grave goods (Ibida, Benkovci/Serdica, Slog-Ravna and Gladno Polje) or the number of individuals in the same grave (Histria, Gladno polje/Remesiana, Slog-Ravna and Sirmium). The relatively high number of new-born burials at Remesiana (11%) could also point us in the direction of the living conditions of the population. Neonatal mortality (in the first four weeks after birth) could be explained by poor sanitation conditions, inadequate diet and susceptibility to various infections,⁹⁶ but such conclu-

⁹⁵ Soficaru et al. 2004, 329.

⁹⁶ Miladinović-Radmilović 2011, 566.

sions must wait for the complete and thorough anthropological analyses, including pathological findings.⁹⁷

Despite the possibility of the aforementioned potential factors, we strongly believe that those burials were not there by accident. Their number shows us that new-borns were buried in the 4th century at the necropolis, possibly even in a separate area (for a short period, at least). Such a practice has been confirmed at the necropolis of Jagodin Mala in Naissus,⁹⁸ Sopianae in Pécs⁹⁹ and Lauriacum in Ziegefeld.¹⁰⁰ The absence of markings or grave goods should not be seen as an argument that 4th-century Remesiana citizens did not care for the youngest as much as they did for others. We are inclined to believe that specific social norms were negotiated in such cases, whether solely for legal purposes or simply because of coping with loss. Different local traditions and beliefs could explain the regional differences between sites where new-born burials were documented. We cannot be sure if parents (or other members of the living community) burying new-

borns were pagan or Christian, or if the custom was (as many were) just transferred from one religious concept to another, with the same or even changed meaning. In the end, it is not so important to label them precisely. It is more important to recognise that not only did the people of Remesiana live together with each other, with no regard for religious affiliations, but they also buried their dead together and paid attention even to those we now perceive as marginalized in death.¹⁰¹ The reasons for that might be found elsewhere – in social arrangements, class affiliation, ethnic origins, or even pre-Roman traditions adapted to new living circumstances.

Acknowledgment

I would like to thank my colleague Dr Tamara Šarkiћ from the Centre for Bone Biology (University of Belgrade – Faculty of Medicine) for her help in dealing with the results of the anthropological analyses of the new-born skeletons discussed in this paper.

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⁹⁷ Such analyses are still under way and are planned for publishing in another paper.

⁹⁸ The results of the excavation in 2022 are still unpublished, but preliminary results show such a possibility.

⁹⁹ Fülep 1984, 176.

¹⁰⁰ Fülep 1984, 176. fn. 182.

¹⁰¹ Janković 2022, 979.

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МАРГИНАЛНИ У СМРТИ: САХРАНЕ НОВОРОЂЕНЧАДИ СА ИСТОЧНЕ НЕКРОПОЛЕ РЕМЕЗИЈАНЕ

Кључне речи. – Сахране новорођенчади, касноримски период, Средоземна Дакија, Ремезијана, посмртни обичаји, пагани, рани хришћани, маргиналност

Током систематских археолошких истраживања на Источној некрополи Ремезијане откривено је 63 гроба. На основу налаза новца из гробова, можемо рећи да се највећи број гробова може датирати у другу половину 4. века, баш у време раних стадијума институционализације хришћанства на овим просторима. За разлику од других некропола у близини Ремезијане, источна некропола је специфична пре свега због налаза јединственог типа сахрањивања – гробова са менсама, изграђених у техници сухозида. Неколико таквих објеката је откривено током преходних година на Источној некрополи. Ове сахране пре свега сведоче о великом труду, времену и пажњи које су чланови заједнице посвећивали својим мртвима.

С друге стране, најмлађи међу покојницима су имали потпуно другачији третман након смрти. Многи од 63 гроба припадају деци (28 сахрана, односно 44%), али је такође откривено бар седам случајева новорођене/мртворођене деце (11% од укупног броја сахрањених, односно 25% од укупног броја сахрањене деце). Ти случајеви су крајње занимљиви јер су сахрањени у плитким гробним рамама, без видљивог обележја и без гробних прилога. Изгледа да је бар део њих сахрањен релативно близу једни другима, па не можемо искључити могућност да је бар у једном тренутку

део некрополе био предвиђен управо за сахрањивање најмлађих. С обзиром на све, ови гробови су често оштећени каснијим укупима а остаци костију су у лошем стању па се неретко дешава да се на некрополи нађу појединачне деце кости или у испунама других гробова или у слоју између гробова.

Истраживања која су се бавила овим феноменом, пре свега у западним провинцијама Царства, фокусирана су, између осталог, и на религијску припадност сахрањених, па су објашњења обично ишла у правцу паганских или хришћанских обичаја. Како су се на Источној некрополи највероватније истовремено сахрањивали и пагани и хришћани, смештање проблема у религијски контекст и објашњење посмртних обичаја додатно је отежано. Ова сахрањена деца су из неког разлога била маргинализована након смрти, било да се ради о разлозима везаним за религијску припадност, локалним обичајима и традицији, припадности класи или друштвеним нормама. Надамо се да су у овом тексту постављена важна питања која се тичу феномена сахране новорођене или мртворођене деце у касноримском периоду, и да смо успели бар на нека од њих да дамо задовољавајуће одговоре.

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MEDIEVAL NESTED CUP WEIGHTS FROM RUDNIK

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Abstract. – During archaeological excavations on Mount Rudnik in 2017, a set of nested cup weights was discovered. According to their typological characteristics, as well as the archaeological context in which they were found, they could be dated to the 15th century. Weights were basic instruments in various forms of trade and, thanks to their form, they became a portable tool, suitable for carrying in a bag. They are distinguished by their thoughtful design, precision and high quality of workmanship. The discovered set belongs to a specific type of archaeological find that is of importance for the study of the methods of measurement and the measurement system used in medieval Serbia.

Key words. – Rudnik, cup nested weights, metrology, litra, Late Middle Age

The results of the archaeological excavations carried out on Mount Rudnik since 2009 have been discussed in the literature on several occasions. Furthermore, the remains of a medieval settlement (marketplace) from the time of the rise of this important mining and trading centre of medieval Serbia are still being explored. So far, six locations have been researched in the area of the small modern town of Rudnik, where the remains of both sacral and profane buildings have been discovered, indicating a continuity of life from the earliest mention of Rudnik at the end of the 13th century until its final fall under Ottoman rule.¹

One of the researched objects appears to be particularly interesting. It was explored in the period from 2013 to 2017, at the Drenje – Dvorište Slobodana Markovića site. The discovered remains belong to a building, built using crushed stone and lime mortar, and consisted of several rooms (Fig. 1). On the uncovered parts, in the western part of the building that was dug into the slope, two construction phases were observed, but it seems that only a short period of time separates them. The purpose of this building was certainly pro-

fane, but at this stage of research it has not been fully clarified. It is possible that the western part had an economic function, while the eastern part could also have been used for residential purposes.² Very similar movable archaeological material was found in all stratigraphic separated layers.

During excavations in 2017, inside the building, at the floor level, several pits were noted, some of which were dug through the mortar floor (Fig. 2). One of them was pit number 26/16, which was located in the south-western corner of the building. It was a barrel-shaped pit with a maximum diameter of 1.20 m, and with its base at 2.75 m, measured from the ground surface. Several fragments of medieval pottery, animal bones, three iron wedges, a small amount of iron slag, larger stones, and a lot of soot were found in the soil with which it was filled.² At the very bottom, under several large stones, a pair of iron tongs was also found.

¹ Радичевић, Ђорђевић, Цицковић 2009; Радичевић, Цицковић 2009; 2013; 2019.

² Цицковић, Марјановић 2018, 168.

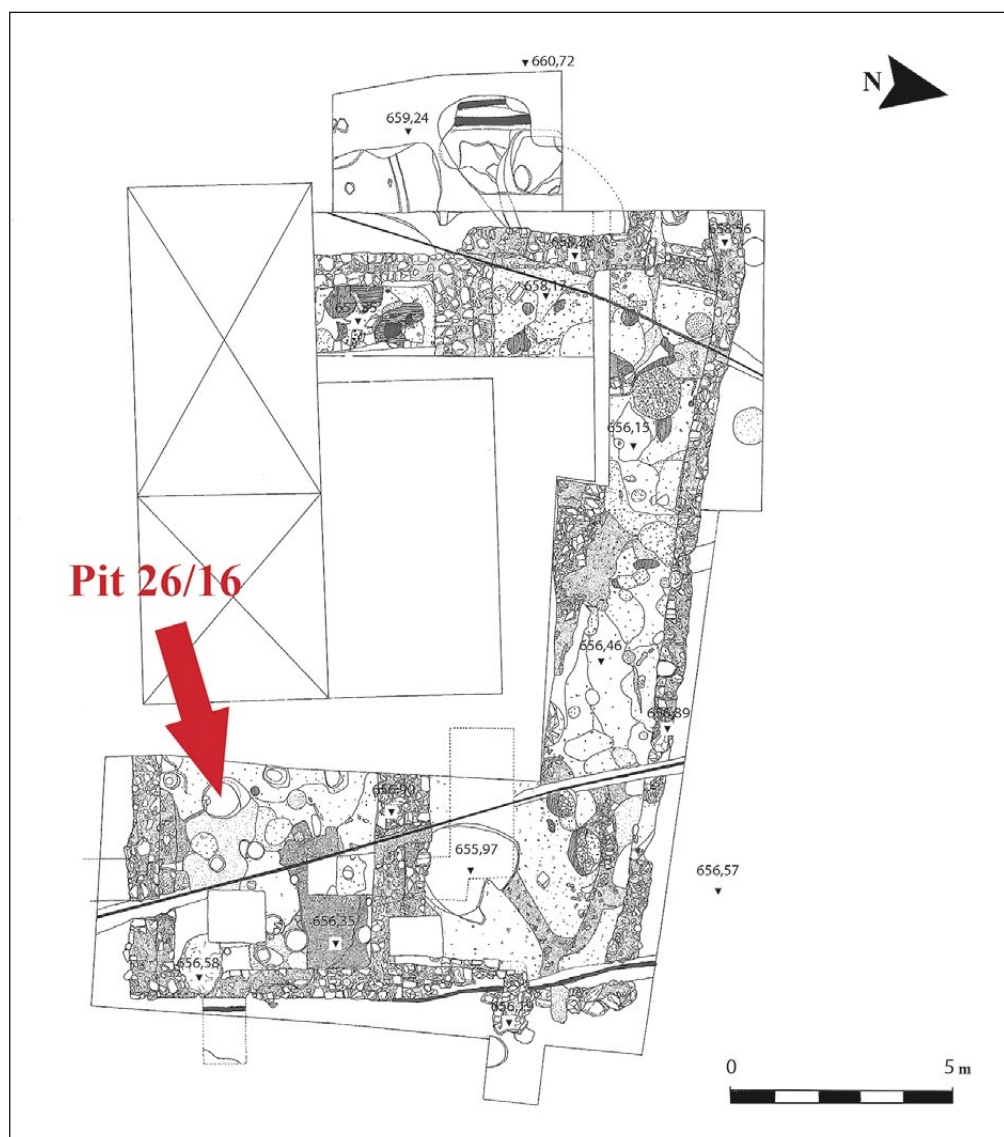


Fig. 1. Rudnik – Dvorište S. Markovića, plan of the building with the position of pit no. 26/16

Сл. 1. Рудник – Двориште С. Марковића, план грађевине са позицијом јаме бр. 26/16

Since there were no other, more chronologically sensitive objects in the investigated pit, the only thing left with which to do an approximate dating is the pottery found. A total of 96 fragments were found. The majority are kitchen pottery, specifically clay pots with finer grains of sand, and a grey, brown, or reddish-brown firing colour (Fig. 3/1–9, 11). Three fragments of a bread baking pan (*crepulja*), of a rough texture, with a rounded rim and an arch-shaped wall were also attributed to hearth vessels (Fig. 3/10). The pots are large and small, with a flared rim, a wide rounded body, and a flat bottom. They were shaped on a potter's wheel, mostly without decoration, but there are

also those with ornamentation on the upper half of the body. These are, most often, bands of horizontally incised lines. Short oblique incisions also occur. Several fragments belong to thin-walled pots of good quality with carefully performed carved decoration. Eight fragments of glazed tableware were also found in the pit (Fig. 3/12–14). These are vessels made of clay with the addition of fine sand, glazed in shades of olive or green. One fragment is characterised by decoration made with a combination of a horizontal, plastic ribs and incised small pits. A characteristic band handle, decorated with deep, oblique notches, is also present (Fig. 3/14).



Fig. 2. Rudnik – Dvorište S. Markovića, interior of the building with the position of pit no. 26/16

Сл. 2. Рудник – Двориште С. Марковића, унутрашњост зграђевине са позицијом јаме бр. 26/16

In general, according to technological and decorative characteristics, the pottery found can be classified as pottery of the 14th and the first half of the 15th century. It does not differ from the pottery discovered at Rudnik within the same building, or at nearby sites in the surrounding area.³ Since the pit from which the fragments originate was dug through the mortar floor, and it can be said that it belongs to the youngest phase of the use of this space; it seems that the dating could be moved closer to the upper chronological limit.

In addition to this standard inventory of various stratigraphic units, an unusual find was discovered directly above the bottom of the pit. Such an item, which has never been found before at Rudnik, is, as far as we know, unique in the territory of Serbia. It is a set of circular weights, of different sizes, placed in a case or housing (Fig. 4).⁴ The weights are designed in the shape of a cup or bowl. The set comprises four weights

and one small lead disc (Fig. 5). Each weight fits exactly into the next larger weight.

The case is conical in shape, with a flat bottom, connected by a hinge to a round lid (Fig. 6). The metal thickness is 1–2 mm. The rim diameter is 46 mm, the bottom diameter is 36 mm, and the height is 25 mm. The lid diameter is the same as the case rim diameter, while its height is 6 mm. Circular traces of manufacture are noticeable inside, at the bottom and around the rim of the recipient. The bottom is circularly perforated, and there is a circular let-off outside. The lid is

³ Шаренац 2019, 69–72.

⁴ The weights are kept in the archaeological collection of the Museum of Rudnik and Takovo Region, Gornji Milanovac, inv. no. A230. Together with the iron tongs, from the same pit, they were conserved by Slobodan Bogojević, senior conservator of the National Museum in Čačak.

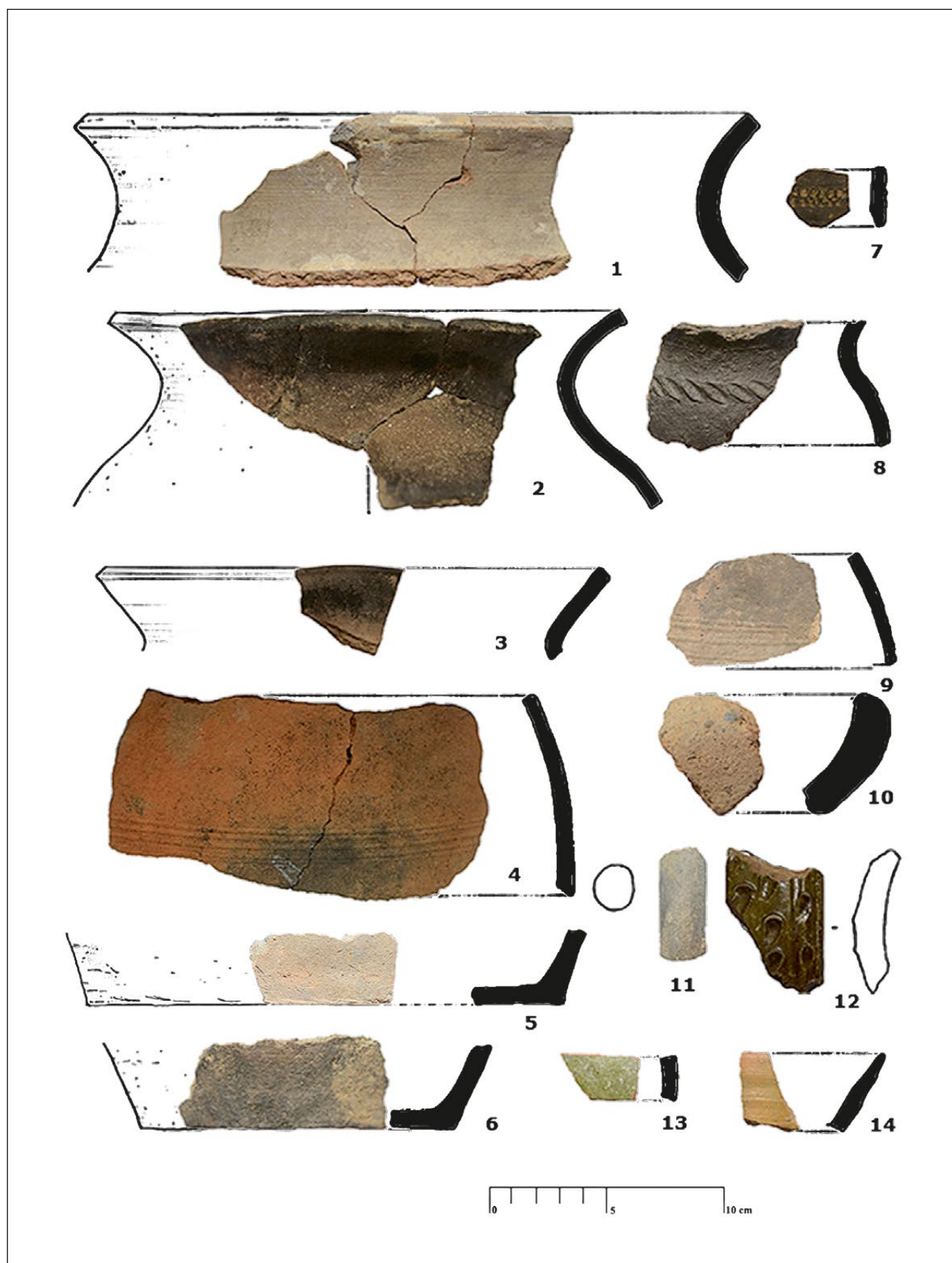


Fig. 3. Pit no. 26/16, pottery (Drawing: D. Ćirković)

Сл. 3. Јама бр. 26/16, грнчарија (цртеж: Д. Ћирковић)



Fig. 4. Rudnik, Set of nested cup-weights, before conservation
(Photo: The Museum of Rudnik and Takovo Region, Gornji Milanovac)

Сл. 4. Рудник, комплеи тејова, пре конзервације
(фото: Музеј рудничко-џаковској краја, Горњи Милановац)

decorated, on the outside, with three concentric circles and a circular let-off with an opening, that corresponding to the one at the bottom. Circular traces of production are visible on the inside of the lid. The dimensions of the hinge are: length 7 mm and height 15 mm. The weights are conical in shape, with a flat bottom. They were made using a mould, and the final finishing was done on a lathe, as evidenced by the characteristic circular traces that can be seen on the bottom and around the rim of the weights. There are small circular grooves at the bottom. One weight (I) has a circular let-off, with a recessed point on the outside of the bottom, while the other (III) has a perforated bottom (diameter of the hole is 3 mm).

	Rim Diameter (mm)	Bottom Diameter (mm)	Height (mm)	Metal Thickness (mm)	Mass (g)
case + lid	46	37	25	1–2	170.12
I	42	30	22	3–4	87.70
II	34	25	16	2–4	58.10
III	26	19	10	1–2.5	16.12
IV	21	17	6	2	10.84
V (disc)	15		2		3.26

Table 1. Dimensions and mass of the weights
Табела 1. Димензије и маса тејова

The weights are made of bronze alloy. The weight of the case (master cup) is equal to the weight of the remaining weights. This relationship continues to the smallest, called the “disk”. Surface analysis, using non-destructive X-ray fluorescence spectroscopy (XRF), showed that the weights contain 94.00% copper, while the rest consists of elements present in the ores of this metal (tin, antimony, lead, with traces of silver, bismuth, nickel, and silicon). Weight IV contains 96.74% copper and the other mentioned elements. The disc alloy consists of 90.13% lead, 7.46% copper, and small amounts of silicon, bismuth, and phosphorus.⁵

The idea with these types of nested cup-weights, was to achieve stable, standardised, easily applicable, and easily portable weights of a specific weight system. Their production was not simple and it involved a complex and controlled process that included masters trained in mould making and handling specialised tools. The masters had to know the standard weights, as well as the tolerance they could meet, that is, the deviation from the standard weight. Considering the manufacturing process, the weights were valuable and expensive, which limited their use to professions that

⁵ The analysis was carried out by chemist–advisor Aleksa Jelić, from the Physical and Chemical Laboratory of the Institute for the Protection of Cultural Monuments of Serbia, in Belgrade.



Fig. 5. Rudnik, Set of nested cup-weights, after conservation
 (Photo: The Museum of Rudnik and Takovo Region, Gornji Milanovac)

Сл. 5. Рудник, комплет шејова, после конзервације
 (фото: Музеј рудничко-таковског краја, Горњи Милановац)

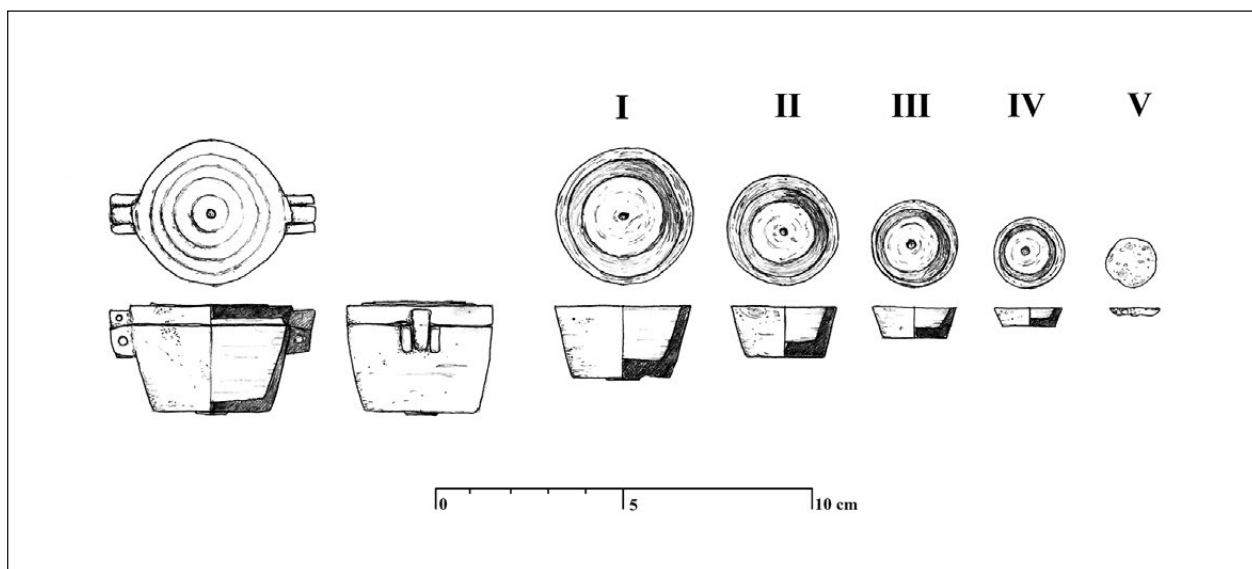


Fig. 6. Rudnik, Set of nested cup-weights (Drawing: D. Ćirković)

Сл. 6. Рудник, комплет шејова (цртеж: Д. Ћирковић)

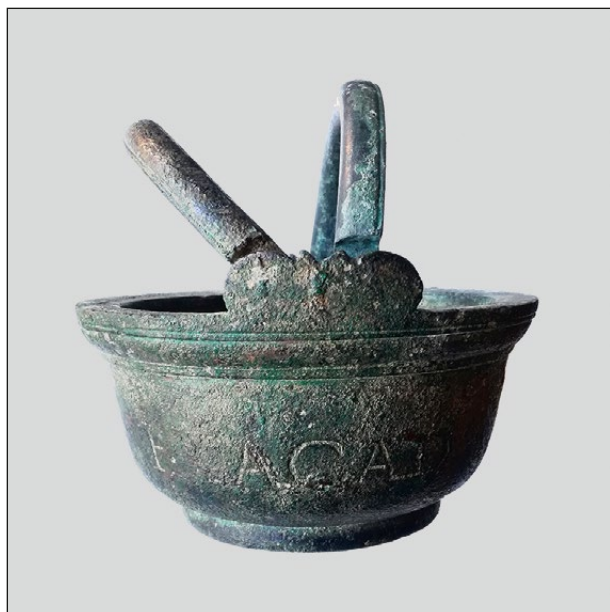


Fig. 7. Cup-weight, Roman period
(Photo: Cabinet of Numismatics and Medals
at the Art Collections of Sforza Castle in Milan)

Сл. 7. Теџ у облику чаше, римски њериод
(фото: Кабинет за нумизмаџику и меѓаље
Умејничке колекције замка Сфорца у Милану)

worked with valuable products that needed to be measured precisely (coin minters, precious metal traders, goldsmiths, money changers, apothecaries...).

Nested cup-weights have been known since Roman times. Examples with the inscription “exactum ad Castoris” guaranteed the conformity of the object’s weight with the official, standard weights kept in the Temple of Dioscuri in Rome (Fig. 7). They were, probably, used from the 2nd century AD. Besides Italy, they are also known in large numbers, mainly in the western Roman provinces: Noricum, Pannonia Inferior, Gaul, Germania and Dacia.⁶

In the Middle Ages, the use of this type of weight revived throughout Europe, and their production continued until the 19th century.⁷ The oldest examples are found from the Byzantine Empire, where they are dated from the late 10th–11th century, and they remained in use throughout the entire medieval period.⁸ From the middle of 13th century, such weights came into widespread use in the western regions of the continent and in Central and Northern Europe.⁹ Their appearance in Eastern Europe is associated with western European merchants. There is a possibility that the weights were made specifically for traders who operated in the east,

or that they were made locally, but modelled on western European ones.¹⁰

The production and use of such weights became very popular from the 16th century, especially in workshops in Nuremberg, where masters produced weights for various measuring systems throughout Europe. From 1538, they had to engrave their mark on every weight they made. When they were used in public institutions, for the purchase and sale of metals, this mark was proof of their reliability, as the accuracy of the weights was periodically checked. The appearance of this type of weights became increasingly complex, and masters decorated the weight cases in styles inspired by the German Renaissance.¹¹

Weights of this type are rare on the territory of Serbia, and they have appeared only as individual finds.¹² As far as we know from the literature, a weight found in Belgrade Fortress is mentioned, as well as two examples from the fortress in Bač. The weight from Belgrade is dated to the period of Hungarian rule, from 1428 to 1521, while the examples from Bač are presented alongside other finds attributed to the 16th–17th century horizon at this site.¹³

An interesting testimony about the use of weights in late medieval Serbia could be a fresco, painted in the southern choir of the Manasija Monastery, in the time before the church’s consecration, which happened in 1418. In the scene depicting the parable of the prodigal son, Christ is shown holding scales in his hands,

⁶ Luciani, Lucchelli 2016, 265–289. The information and photographs of the weights from Italy were kindly provided by Rodolfo Martini of the Cabinet of Numismatics and Medals at the Art Collections of the Sforza Castle in Milan.

⁷ Houben 1984; Algar, Egan, 2001.

⁸ Davidson 1952, 206–207, Nos. 1619–1633; Steuer 1997, 334; Владимирова-Аладжова, Аладжов 2008; Владимирова-Аладжова 2010; Tekin 2015, Plate 180–186, Nos. 684–704.

⁹ Piles á godets du Moyen Age 1988, 381–400; Steuer 1997; Holtman 1999; Doležel 2008.

¹⁰ Коваль 2013, 16–18, fig. 5.

¹¹ Husband 1986, 429–430, cat. 238.

¹² During archaeological excavations on Mount Rudnik in 2022, at a site Metaljka about 8 km northwest of the Dvorište Slobodana Markovića site, another weight of the same type was found. According to dimensions and weight, it is closest to weight IV from the set (rim diameter 2 cm, bottom diameter 1.6 cm, height 0.7 cm, weight 9.80 g). It has not been published and it is kept in the archaeological collection of the Museum of Rudnik and Takovo Region, Gornji Milanovac.

¹³ Бикић, Иванишевић 1996, 268, fig. 12/8; Станојев 2019, 253, cat. nos. 19 and 20.



Fig. 8. Manasija Monastery, Parable of the Prodigal Son, detail (After: Сїародубцев 2016; 129, сл. 125)

Fig. 9. Petrus Christus, A Goldsmith and His Clients, 1449, oil on panel, 98 × 85 cm.

Lehman Collection, Metropolitan Museum of Art, New York, inv. no. 1975.1.1. Colour figure available online (<https://www.metmuseum.org/art/collection/search/459052>)

Fig. 10. Tractatus de herbis, Biblioteca Estense Universitaria, Modena, Colour figure available online (<http://bibliotecaestense.beniculturali.it/info/img/mss/i-mo-beu-alfa.l.9.28.pdf>)

Сл. 8. Манасїиp Манасија, Парабола о блудном сину, деїшаль (їрема: Сїародубцев 2016; 129, сл. 125)

Сл. 9. Пеїурус Хрисїус, Златар и његови клијенти, 1449. їодина, уље на дасци, 98 × 85 цм. Колекција Леман, Музеј уметносїи Меїуpойолиїен у Њујорку, инв. бр. 1975.1.1. илустїрација досїуїна на инїернеїу (<https://www.metmuseum.org/art/collection/search/459052>)

Сл. 10. Трактат о биљкама, Библиоїека Есїенсе, Могена, илустїрација досїуїна на инїернеїу (<http://bibliotecaestense.beniculturali.it/info/img/mss/i-mo-beu-alfa.l.9.28.pdf>)

and on one pan is a weight that could be analogous to the examples found in Rudnik (Fig. 8).¹⁴ We have no knowledge of other depictions of weights in our medieval frescoes. On the other hand, in western art from the mid-15th century, nested cup weights were often depicted. As examples, we mention only some of them that would belong to a time close to the examples from Rudnik. The Robert Lehman Collection at the Metropolitan Museum in New York holds an oak panel painted in oil paints, “A goldsmith in his shop”, signed and dated in 1449, by Petrus Christus, a leading painter in Bruges (Flanders).¹⁵ The painting shows a young couple and the goldsmith, measuring a wedding ring on a scale (Fig. 9). A set of weights is in front of the goldsmith. In an example of the illustrated book “Tractatus de herbis”, kept in the Estense Library in Modena and dated to 1458, a merchant is shown measuring, using nested cup-weights (Fig. 10).

Outside Serbia, the geographically closest analogies to the examples from Rudnik are found in north-eastern Croatia and Hungary, where similar weights are, mainly, dated to the 15th–16th century.¹⁶ According

to condition of the find, the oldest weight, for now, would be the one from the hoard from Stari Jankovci, near Vinkovci.¹⁷ Together with other hoards in the immediate vicinity, the storage time of this hoard is placed at the end of the 1st and the beginning of the second third of the 15th century or in the period from the end of the 14th to the end of the 1st and the beginning of the second third of the 15th century.¹⁸ In the Balkan region, more numerous examples are also known from the territory of Bulgaria, which shows that this type of weight was in widespread use during the Second Bulgarian Empire.¹⁹

¹⁴ Томић, Николић 1964, 70–71, цртеж 3, сл. 51–52; Стародубцев 2016; 131, сл. 129.

¹⁵ Duffin 2011.

¹⁶ Radić, Bojčić, 2004, p. 45–83, cat. no. 44; Gyürky 1981, 38–39, 169, Abb. 39, 40, Taf. 2: 20; Szatmari 1999, 185–186, 10 кеп. 3; Hol 2000, 13–14, 30–31, 106, Abb. 5a, 6

¹⁷ Šplajt 2024, 150–151, 154, tab. No. 7

¹⁸ Demo 2014, 110–111.

¹⁹ Христов 2008; Владимирова-Аладжова 2010, 683–686.

According to the typology of nested cup-weights made by R. Holtman, the set from Rudnik would be related to models E2 and E3, which were used in the period from the 14th to the first half of the 16th century. Although a complete analogy is lacking, it would be somewhat closer to model E3, which is attributed to the period from the mid-15th to the first half of the 16th century.²⁰ By studying examples from Central European areas, it was concluded that the oldest finds, from the second half of the 13th and the first half of the 14th centuries, were cast from bronze, without additional processing, were largely conical in shape, with simple closing mechanisms. Characteristic decorations are impressed circular motifs on the rims or lids of the case²¹. Since the beginning of the 15th century, specimens that were in general use, unlike their older predecessors, were additionally shaped on a lathe after casting, as was the case with the Rudnik weights.

A set of weights for precise measurement, found at Rudnik in 2017, belongs to a high-quality production. The craftsman had to take into account the mass of the weights and the fact that they needed to be inserted one into another. These items are of excellent quality and solid structure, which suggests that they were intended for long-term use. There are no visible manufacturer's marks on the weights, nor a heraldic sign, symbol, inscription, or abbreviation. It was most likely an unofficial trade weight, made by a local merchant or trade agreement according to the local standards of that time.

In the Middle Ages, Rudnik was a major mining and trading centre in the northern part of the state.²² It was inhabited by a large number of people of various professions: merchants, craftsmen, leaseholders, and mine owners. The presence of merchants, who used various currencies and measurement standards, meant that a certain number of money changers had to operate in Rudnik. It is also known that Rudnik had a mint, which operated throughout the Middle Ages, where Serbian rulers, regional lords, and despots minted coins.²³ All these professions came into contact with silver ore, and precise measurement was necessary for their work. That is why the need for the accuracy of the measurement of precious materials and the guarantee of the value that has been measured was imposed.

Weights and measures in medieval Serbia were characterized by similarities with the measures of Byzantium and Mediterranean cities and, on the other hand, by a richness of regional forms. The official metrological system was adopted from Byzantium, but a large number of traders from the Adriatic region and

western European countries operated in Serbia, using the measures of their own countries. Control of the trade and quality of precious metals in the form of state, city, or guild supervision probably existed in Serbia, as well as it did in western Europe, Byzantium, and coastal cities.²⁴

The basis of the system of weights was the *litra* (pound). In the Middle Ages, the system established during the time of Constantine the Great, which was also adopted by Byzantium, was preserved, whereby the *litra* was divided into 12 ounces, each of which contained 6 *exagias* (Latin: *exagium*). The *exagia* was further divided into halves. Therefore, 1 *litra* = 12 ounces = 72 *exagias* = 144 halves.²⁵

There were different *litræ* of different weights that existed, and the one that was used depended on the type of material being measured. Thus, a 'thin' measure was used for measuring expensive goods (precious metals, spices, pigments, etc.), while the opposite, a 'thick' measure, was used for measuring food and items of lesser value.²⁶

Although precision was expected in the measurement of precious metals, medieval weights could not achieve the accuracy of today's measuring instruments. Consequently, when working with very expensive materials, such as silver, mints tolerated errors of nearly 1%. In the Regulation for the Janjevo mine, from 1488, an error of 0.78% was taken into account. Although, as a rule, the largest weight in the set of weights is exactly the sum of all the smaller weights, in the Rudnik set there is a deviation of 3.35%. The largest weight has a mass of 170.12 g, while the sum of all the other weights in the set, including the disc, is 176.02 g. Metrological studies have been published on the topic of weight variations of weights, stating that we must take into account the fact that a metal weight could lose up to 5% of its mass as a result of corrosion of the object, as well as from errors at the time of manufacture.²⁷

According to written data, inland cities had their own specific measures. Thus, it is known that Priština,

²⁰ Holtman 1999, 21–24, tabel 2, Model E2, E3.

²¹ Doležel 2008, 196–197.

²² Храбак 1984; Шуица 2014.

²³ Иванишевић 2001, 63–64.

²⁴ Ћирковић 1997.

²⁵ Костић 1904, 174; Ковачевић 1878, 178–182.

²⁶ Ћирковић 1997, 136.

²⁷ Pottier 2004, 51–133; Holland 1986, 171–201.

Novo Brdo, Srebrenica, Belgrade, Smederevo, Rudišta, and Rudnik itself had their own measures for silver. Thanks to data in which a certain weight is expressed simultaneously in local and known Dubrovnik measures, it was possible to reconstruct the sizes of some of these litras. From a business book of the Dubrovnik merchant Mihailo Lukarević, who worked in Novo Brdo, we saw that the Dubrovnik, Novo Brdo, and Priština measures also differed. While the Dubrovnik litra weighed 327.93 g, both Serbian measures were heavier. The Novo Brdo litra was 337.24 g, and the Priština litra was 345.6 g. Although we see that the difference ranged from 9–17 g, or 3–5%, the merchant Lukarević stated in one place that all these measures were equal.²⁸

While the sizes of the litra for Novo Brdo and Priština are known from written sources, discovery of the set of weights from Rudnik could indicate the size of the litra used in this mining and trading centre. The total weight of all weights is 346.14 g, which could represent the Rudnik litra. However, for a reliable confirmation of this assumption, new discoveries, written data, and material traces are needed.

If we accept the Rudnik litra of 346.14 g, the ounce, its twelfth part, would be 28.84 g. The closest weight to that value is the sum of weights III, IV, and V (the disc), and it is 30.22 g, which, according to this metrology, would be the possible value of the Rudnik ounce. This

would make it close to the values of the ounce used for measuring precious metals and other valuables in Adriatic coastal cities and western European countries. The Serbs inherited the tradition of regulated trade weights, as well as the system of measurement control, on the one hand from Byzantium and coastal cities, and on the other hand, from merchants of western European countries. Metrology tells us that the Rudnik weights were calibrated so that they could fit into a dual measurement system, the traditional duodecimal system of weights and measures (with units based on the number 12), as well as the western European system (with units based on the number 16). The main carriers of metal trade in the 14th and 15th century at Rudnik were merchants from the Adriatic coast, primarily from Dubrovnik and Kotor. Besides them, there were Greeks, Venetians, and others.²⁹ Ores and metals were measured both in mines and smelters, as well as in the office of the measurement official, the mint, and craft workshops. The measurement process itself required precise tools and expertise, which was not always available. Since written sources do not say anything more specific about this, the set of weights found at Rudnik belongs to a specific type of archaeological material, which is of exceptional importance for studying the methods of measurement and the measurement system that was applied in this part of medieval Serbia.

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Часопис *Старинар* је доступан у режиму отвореног приступа. Чланци објављени у часопису могу се бесплатно преузети са сајта часописа и користити у складу са лиценцом Creative Commons – Ауторство-Некомерцијално-Без прерада 3.0 Србија (<https://creativecommons.org/licenses/by-nc-nd/3.0/rs/>).

²⁸ Ћирковић 1997, 138.

²⁹ Храбак 1984.)

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СРЕДЊОВЕКОВНИ ТЕГОВИ СА РУДНИКА

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Приликом археолошких ископавања на Руднику 2017. године, на локалитету Дрење – Двориште Слободана Марковића, у унутрашњости истраживаног објекта, констатовано је више јама, од којих су поједине укопане кроз малтерни под (сл. 1). Једна од њих била је и јама означена бројем 26/16, која се налазила у југозападном углу (сл. 2). У земљи којом је била испуњена пронађено је више уломака средњовековних посуда, животињске кости, три гвоздена клина, мало гвоздене згуре, ломљени камен и доста гарежи. На самом дну, испод неколико крупнијих каменова пронађена су и једна гвоздена клешта. Како није било других, хронолошки осетљивијих предмета, за оквирно датовање једино преостаје нађена грнчарија (сл. 3), која се према технолошким и декоративним одликама може сврстати у оквире грнчарства 14. и прве половину 15. века. Како је јама укопана кроз малтерни под, па се може рећи да припада најмлађој фази коришћења овог простора, чини се да би се датовање могло померити ближе горњој хронолошкој граници.

Непосредно изнад дна јаме откривен је и један налаз какав не само да на Руднику раније није посведочен већ је, колико нам је познато, за сада јединствен на територији Србије. Ради се о комплексу тегова кружног облика, различите величине, уклопљени један у други и смештени у кућишту. Направљени су од легуре бронзе. Кућиште је коничног облика и равног дна, шарком повезано са поклопцем који се затварао на шарнир. Унутар њега смештена су четири тега и мали оловни диск (сл. 4–6). Кућиште и тегови су израђени помоћу калупа, а накнадна дорада је обављена на стругу.

Идеја за овакву врсту склопивих тегова била је да се дође до стабилних, стандардизованих, лако применљивих и лако преносивих тегова одређеног система тежина. Њихова израда није била једноставна и подразумевала је сложен и контролисан процес који је укључивао мајсторе обучене за израду калупа и руковање специјализованим алатима. Мајсторима су морале бити познате стандардне тежине, као и толеранција коју могу да испуне, тј. одступање од стандардне тежине. Ако се узме у обзир поступак израде, тегови су били драгоцени и скупи, што је њихову употребу ограничавало на професије које су радиле са производима од вредности које је требало прецизно измерити (ковничари новца, трговци драгоценим металима, златари, мењачи новца, апотекари...). Тегови у облику посуде познати су још од римског доба (сл. 7). У средњем веку њихова употреба оживљава широм Европе, а производња се наставља до 19. века. Најстарије примерке налазимо на простору Византијског царства, где се датују од касног 10–11. века, а остају у употреби током читавог средњовековног периода. Од сре-

дине 13. века, овакви тегови улазе у широку употребу у западним регионима континента и централној и северној Европи. Њихова појава на истоку Европе доводи се у везу са западноевропским трговцима.

Тегови ове врсте до сада су ретко посведочени на територији Србије, само као појединачни налази у Београду и Бачу, датовани у раздобље 15–16. века. Истом времену приписани су слични тегови на североистоку Хрватске и у Мађарској. У балканском окружењу, бројнији примерци познати су и са територије Бугарске, и на основу њих се види да је ова врста тегова била у широкој употреби током Другог бугарског царства. Према условима налаза и својим технолошким карактеристикама руднички примерци би се најпре могли приписати 14. веку, и то првој половини столећа.

Занимљиво сведочанство о употреби тегова у позно-средњовековној Србији могла би да представља фреска насликана почетком 15. веку у јужној певници цркве у Манастију. У сцени која приказује *Причу о блудном сину* приказан је Христ који у рукама има теразије, а на једном тасу налази се тег који би могао бити аналоган примерцима пронађеним на Руднику (сл. 8). Нису нам познати други прикази тегова у нашем средњовековном живопису. На другој страни, склопиви тегови у облику посуда су од средине 15. века често приказивани у уметности Запада (сл. 9 и 10).

Мере у средњовековној Србији с једне стране карактерише сродност са мерама Византије и медитеранских градова, а с друге стране богатство регионалних облика. Градови у унутрашњости су имали своје посебне мере. Захваљујући писаним подацима у којима је нека тежина исказана истовремено у локалним и познатим дубровачким мерама, било је могуће реконструисати величине литре у Новом Брду (337,24 г) и Приштини (345,6 г). Проналазак комплекта тегова на Руднику би могао указати на величину литре која се користила у овом рударском и трговачком центру. Укупна тежина тегова је 346,14 г, што би могло представљати рудничку литру.

Главни носиоци трговине металима у 14. и 15. веку на Руднику су били трговци са Приморја, у првом реду Дубровчани и Которани. Руда и метали су се мерили како у рудницима и топионицама, тако и у канцеларији службеника за мере, ковници и занатским радионицама. Сам процес мерења је захтевао прецизан алат и стручност. Будући да писани извори о томе не говоре ништа одређеније, комплет тегова пронађених на Руднику спада у специфичну врсту археолошке грађе, која има изузетан значај за проучавање начина мерења и мерног система који је примењиван у овом делу средњовековне Србије.

КРИТИКЕ И ПРИКАЗИ – COMPTES RENDUS

Aleksandar Bulatović, *THE EARLY AND MIDDLE BRONZE AGE IN THE CENTRAL BALKANS*, Oxbow Books, Oxford 2025; Page 241, Illustrations and graphs 155

Finally, after more than four decades of waiting, Serbian archaeology has received a monograph about the Early and Middle Bronze Age on its territory. Such an important synthesis could only have been realized by an archaeologist whose career is marked by significant discoveries related to this period of prehistory, and whose respectable bibliography undoubtedly shows that he is one of the most accomplished scholars to have worked at the Archaeological Institute in Belgrade and, we may freely say, in Serbia at this moment. The author is Dr Aleksandar Bulatović, Principal Research Fellow, who began his career at the National Museum in Vranje and continued it at the Archaeological Institute, where – according to the ranking list of the Ministry of Science of the Republic of Serbia in the field of Humanities and Social Sciences – he is the highest-ranked researcher. The situation regarding publications dealing with the Bronze Age in Serbia had not significantly changed since 1983, when, in the series *Praistorija jugoslovenskih zemalja IV: The Bronze Age*, our esteemed colleague Draga Garašanin and academician Milutin Garašanin presented an updated, though somewhat concise but nonetheless informative, synthesis of the development of Bronze Age communities in the Central Balkans. The same period was put in the spotlight by academician Nikola Tasić in *The Praistorija Vojvodine* (1972) and *The Yugoslav Danube Region from the Indo-European Migrations to the Scythian Penetration* (1983). The same author published several other papers and edited another important publication, entitled “*Kulturen der Frühbronzezeit im Karpatenbecken und Nordbalkan*” (1984). Although our respected senior colleagues correctly established the cultural continuity of the Bronze Age in this region, there arose a great need for chronological corrections, as well as for explanations of the specific cultural “censorships” that occurred during the Bronze Age here. Apart from the lack of syntheses, Serbian prehistoric

archaeology had also long suffered from a gap in absolute dating, since by the beginning of the 21st century only 12 absolute dates were available for this area. As a result of this, at the start of the 21st century, archaeologists in Serbia were forced to rely mainly on data from the Carpathian Basin origin, which motivated Aleksandar Bulatović to attempt to change this situation through international scientific projects and collaboration. Another major problem was the large number of unpublished or insufficiently published investigations of important tell-settlements and necropolises from the Serbian territory, many of which had been excavated decades earlier. Numerous smaller excavations are known only through museum documentation; unpublished or preliminary reports, especially those connected with large-scale rescue excavations, which marked the second half of the 20th century (e.g., at the Iron Gates). As a consequence of this very difficult situation, characterized on one hand by a small number of published results, and on the other by a very large number of excavations, it was only a researcher such as Aleksandar Bulatović who was capable of piecing together the scattered mosaic of unconnected data on the Bronze Age in this region into a clear picture of all aspects of life and cultural movements in the Central Balkans during the 3rd and 2nd millennia BC. Importantly, this synthesis is not based exclusively on the stylistic and typological characteristics of material culture, as was the case in earlier literature.

As a typical representative of the new generation of researchers, Aleksandar Bulatović already recognized the key challenges faced by contemporary archaeology at the very beginning of his work on the Bronze Age decoding. Over the course of three decades of dedicated research, he succeeded in publishing a corpus of publications of exceptional importance for the development of Serbian archaeology, thereby leaving a profound

mark on the study of this period. In the following, we will attempt to explain how such an achievement was made possible and which circumstances contributed to its realization.

In his rich scientific and research career, Aleksandar Bulatović has been credited with the discovery of several important Bronze Age sites, while also taking part in a number of excavations that he did not personally manage. His first major discovery took place in 2012 with the discovering of an EBA-MBA necropolis of cremated burials at Ranutovac near Vranje (pp. 79–80). This necropolis was discovered thanks to rescue excavations conducted along the E75 motorway in southern Serbia. It consists of circular stone structures with the remains of cremated individuals deposited in their central sections. Absolute dates obtained from this necropolis have provided valuable data on a population associated with the Armenohori culture, which buried its deceased in this place at the turn of the 2nd millennium BC (i.e., at the transition from the Early to the Middle Bronze Age). To date, this necropolis remains the only known site of its kind from this period in southern Serbia. Aleksandar Bulatović also directed revision excavations at the most important tell sites in the Nišava river basin, namely Bubanj-Novu Selo and Velika Humška Čuka. These sites had been investigated several times before and after the Second World War, but had been either not at all, or only insufficiently published until that point. The results of these rescue excavations – at least in the case of the Bubanj-Novu Selo tell settlement – were obtained at the very last moment, and only a small portion of the settlement could be explored, while the rest of it had been destroyed during the 1990s. The cultural stratigraphy documented at that time, representing the continuation of the Bubanj-Hum I–III cultural sequence, was further supported by a series of absolute dates. These findings were published in the monograph “Bubanj: The Eneolithic and the Early Bronze Age Tell in South-eastern Serbia” (*Mitteilungen der Prähistorischen Kommission*, vol. 90, Austrian Academy of Sciences Press, Vienna, 2020) (pp. 56–57). During his research career, Aleksandar Bulatović also took part for several years in the investigations of the prehistoric observatory of Kokino, in North Macedonia. From this collaboration with the National Museum in Kumanovo emerged the monograph “The Bronze Age in the South Morava Basin and the Pčinja Valley”, which defined cultural developments in the area of today’s space between Serbia and North Macedonia during EBA III and MBA (pp. 109–110). In recent years, Bulatović has also discovered a solitary Yamnaya grave in southern Serbia (Svinjarička čuka site). This discovery strongly resonated within Serbian prehistoric archaeology, since it had previously been considered almost impossible for this cultural phenomenon to have penetrated so deeply into the “heart” of the Central Balkans (pp. 58–59). Most recently, rescue excavations have been conducted along the Iron Gates Corridor near Požarevac, in the hinterland of the Danube river flow, where two more Early and Middle Bronze Age sites have been uncovered (Marijansko Brdo and Cigansko Brdo) (pp. 15, 121). Thanks to these investigations, Aleksandar Bulatović has succeeded not only in identifying cultural continuity from the Early to the Middle Bronze Age on the territory of Serbia, but also in confirming it by means of absolute dating (Table 1).

Another highly important aspect that contributed to the realization of this monograph is the exceptional promptness with which the results of the excavations in which he participated were published. In this respect, Aleksandar Bulatović has prov-

en to be the person for whom Serbian prehistoric archaeology had long been waiting. The results of his research have been published in numerous high-ranking domestic and international journals, and three monographs have also appeared as international editions. Particular praise is due for the attention that this author devotes to archaeological context, rather than to the mere importance of finds discovered in insecure or insufficiently defined contexts, which is a trap into which many researchers often fall, drawn by the apparent significance or uniqueness of such finds. For this reason, we can confidently cite his results in our own publications without any doubt regarding their authenticity.

Over the past decades, Aleksandar Bulatović has devoted great effort to gaining first-hand knowledge of Bronze Age material culture from the content of the depots of several museums on Serbian territory. This work resulted in four volumes of the series *Arheološka građa Srbije* (Archaeological Finds of Serbia), in which he appears as a sole or a co-author. These volumes cover collections from the museums in Vranje, Leskovac, Negotin, Bor, Majdanpek, and Loznica. Beyond Serbia, Bulatović extended his work on the publication to colleagues from the National Museum in Kumanovo, with whom he co-published Bronze Age finds from the sites of Pelince and Kokino (pp. 69–72), two exceptionally important sites for the comparative analysis of Bronze Age in southern Serbia and the north of North Macedonia. It should be emphasized that, in addition to publishing finds from the museum collections, Aleksandar Bulatović also frequently took part in excavations carried out by these museums, providing his expert assistance. Such activities enabled him, more than many archaeologists in Serbia, to gain a comprehensive understanding of the distribution of sites and necropolises in this territory, and to recognize the various cultural influences and movements originating from neighbouring regions.

In order to successfully process, interpret, and integrate into a broader framework the large amount of data obtained from archaeological excavations, physico-chemical analyses of metals, and absolute dating, it is not sufficient to be familiar only with the situation in Serbia, it is also important to be acquainted with developments in neighbouring regions. In addition to the aforementioned research in the Republic of North Macedonia, over the years, Aleksandar Bulatović has established and maintained highly active contacts with colleagues from Bulgaria and Romania. For this reason, he dedicated the present monograph to our late colleagues, Jovica Stankovski (Kumanovo) and Alexandru Szentmiklosi (Temisioara). His thorough understanding of the production and distribution of copper, bronze, and gold artifacts in the Central Balkans has also been greatly enriched by his long-standing collaboration with Artur Bankoff and Wayne Powell from the United States (Brooklyn College, New York), as well as with Radu Bajunaru (Romania). The results of this fertile collaboration are best illustrated in Chapters 2.6.6 and 3.6.5.

Another important contribution of this monograph is its critical reassessment of theories on the Bronze Age in Serbia which, due to the passage of time and the significant technological advances made in the meantime, finally had to be revised and surpassed. Although the first absolute dates for the Bronze Age in Serbia appeared in as early as the mid-1980s, previous Serbian archaeologists were not inclined to embrace the possibilities offered by the rapid development of radiocarbon (C14) and AMS dating technologies that took place at the turn of the 21st century. For this reason, we may say that since the hypoth-

eses put forward by Draga and Milutin Garašanin, as well as Nikola Tasić, no major progress had been achieved in expanding knowledge of the Bronze Age in Serbia, until Aleksandar Bulatović systematized the chronology of this sequence of the prehistory, primarily thanks to the large number of absolute dates. This is the reason why this monograph is of such importance for prehistoric archaeology in Serbia: based on clear parameters provided by absolute dating and their calibration, it offers a new perspective on the Bronze Age in the 3rd and 2nd millennia BC. Aleksandar Bulatović's discussion of the work of our esteemed colleagues from nearly half a century ago shows that they were, indeed, on the right path, but that they worked in a time when such technology was still in its infancy and, in many cases, difficult to access under the conditions prevailing in the former Republic of Yugoslavia. His aim is not to criticize earlier chronological systems, but rather to correct and properly contextualize them, so that the Bronze Age chronology of Serbia may be aligned with the systems that have long been in use in neighbouring countries, particularly within the Greek and Bulgarian archaeological schools (pp. 233, 236; Fig. 4.16, 4.17).

For all the reasons outlined above, we find it justified to state that Aleksandar Bulatović is one of the few archaeologists from this region who uses a truly multidisciplinary approach in addressing the problems of the Bronze Age. Recognizing that excavations of prehistoric sites today cannot be fully interpreted without a large series of absolute dates, he has, through various scientific projects, succeeded in securing funding for the realization of such extensive chronological datasets. To this end, he has participated in international projects in collaboration with the Fritz Thyssen Foundation Atlas Project (Stockholm), Brooklyn College (New York), and the Austrian Archaeological Institute of the Austrian Academy of Sciences (Vienna). However, the most significant breakthrough in this direction came through his collaboration with Maja Gori and Mark Vander Linden when, in *Radiocarbon* vol. 62 (2020), they published a new chronology of the Early Bronze Age in Serbia (p. 9), a framework that will, in the future, be accepted by other scholars who have investigated the same period. Collaboration with colleagues from Brooklyn College has also produced an extensive series of lead isotope analyses on copper and bronze objects from the Central

Balkans. These results will be instrumental in clarifying the processes by which Bronze Age communities transitioned from the use of arsenic to tin bronzes (pp. 211–212). In publishing the results of his research, Aleksandar Bulatović also pays great attention to zooarchaeological analyses, always obtained from well-defined contexts, which, in many cases, provide crucial insights into the reconstruction of the economies of the communities that once inhabited these areas (sections 2.4.6; 3.6.4). Special attention is devoted to the first appearance of the horse in this region (section 2.6.5). The economic aspects of Bronze Age communities in Serbia had not been addressed in this way since the research conducted nearly half a century ago by Hasckell Greenfield.

As we have highlighted before, a monograph of such significance cannot be realized without the ability to process a vast amount of data relating to all known aspects of the life of Bronze Age communities. Their systematization, the clarity of presentation, and the illustrative supplements – such as depictions of material culture and distribution maps of sites and finds – are of immense importance. After several decades, they finally allow us, in a comprehensible form, to understand how prehistoric populations settled the territory of Serbia during the 3rd and 2nd millennia BC. For this reason, this publication, so important for the Central Balkans, has been long awaited. One of the reasons for this is, among other things, the fact that even after so much time the results of excavations at the tell settlements of Gomolava and Židovar have still not been published, and the scientific community continues to wait for them. The situation with the research at the Feudvar tell site is somewhat better, but these investigations were interrupted due to the political circumstances in the Balkans at the time, which to some extent makes this understandable.

To emphasize once again: this monograph, of great significance for Serbian prehistoric archaeology, undoubtedly deserves to serve as a textbook for future generations. Clarity, precision, and conciseness are the most important qualities of this work. For this reason, we look forward with great anticipation to the author's next publication.

Aleksandar KAPURAN

Надежда Кечева, АРХЕОЛОГИЧЕСКА КАРТА НА БЪЛГАРИЯ. Недеструктивни методи за теренни археологически проучвания и приложение на географски информационни системи / Nadezhda Kecheva, ARCHAEOLOGICAL MAP OF BULGARIA. Non-destructive Methods for Archaeological Fieldwork Activities and the Application of Geographic Information Systems
Национален археологически институт с музей при Българска академия на науките / София / Sofia 2024.
411 страна текста, 133 фотографии, 10 табела

У интердисциплинарном простору савремене археологије, где се технолошке иновације стапају с теоријским оквиром, допринос Надежде Кечеве на изради свеобухватне дигиталне и интерактивне карте Бугарске дефинише нове стандар-

де за документацију локалитета, истовремено нудећи реплицирајући модел ван матичне земље. Монографија пред нама представља докторску дисертацију, коју је ауторка успешно одбранила 2018. године, а која нуди редак спој

практичне мудрости и технолошког напретка и представља релевантно методолошко полазиште за унапређење неструктивних археолошких истраживања. Од тренутка одбране тезе до њеног објављивања, студија је, како ауторка наводи, делимично ажурирана. Она се бави ревизијом постојећих и презентацијом нових сазнања у оквиру археолошке карте Бугарске применом неструктивног археолошког истраживања, преваходно кроз примену геоинформационих технологија. Истраживања у оквиру студије почивају на три нераздвојна стуба у процесу археолошког истраживања, а то су теренско рекогносцирање, даљинска детекција и геофизичка испитивања, при чему географски информациони систем обавља улогу дигиталног скелета који обједињује податке у хијерархијски просторни модел – од регионалних образаца насељавања до анализа појединачних локалитета. Објављена студија се састоји од уводног дела, у којем нас ауторка упознаје са значајем употребе неструктивних теренских археолошких истраживања, циљевима и задацима у оквиру дисертације, методима, изворима и основним појмовима који се појављују у самом раду. Након уводног поглавља, следи срж рада, коју чине четири поглавља. У првом поглављу, под називом *Археологически теренни издирвания*, ауторка објашњава теоретске принципе који су утицали на сам развој методолошког приступа, који се користи приликом теренског археолошког истраживања, почев од настанка процесне археологије. Такође, кроз поглавље ауторка даје шири приказ и анализира методолошки приступ приликом истраживања од његовог почетка па све до појаве физичко-хемијских анализа и неструктивних метода. Сходно томе да је монографија намењена искључиво стручној јавности, ствара се утисак да је и поред најбоље намере ауторке да нас упозна са током развоја, како теоријског, тако и методолошког приступа, поглавље доста сувопарно и преобимно. У другом поглављу, *Дистанционни и геофизични изследвания в археологията. Приложение на географски информационни системи*, ауторка наводи методе даљинске детекције, геофизичких истраживања и географских информационних система (GIS), и објашњава њихов настанак, општи развој и примену у оквиру археолошких истраживања. Такође нас упознаје са основама потребним за коришћење поменутих метода, као и са напредним основама приликом анализе добијених података, посебно када је реч о географским информационим системима (GIS). Ово поглавље представља веома добар преглед неструктивних метода и њихову примену у оквиру археолошких истраживања. Такође, може умногоме послужити приликом едукације, како студената, тако и колега које нису уско повезане са обрађеном темом. У трећем поглављу, под називом *Археологическа карта*, ауторка нас упознаје са богатом историјом археолошких истраживања на бугарском тлу, од пионирских путовања браће Шкорпил почетком 20. века све до савремене примене LiDAR-а и других инструмената, те их анализира са становишта проблематике модерне археолошке науке, односно бави се утицајем

ерозије, механизоване пољопривреде и урбаног развоја на непокретно културно наслеђе. Добро постављена критичка анализа за резултат је имала и сазнање да без стандардизованих метода прикупљања података, чак и најсавременија технологија може произвести илузорну слику историје. Посебна пажња посвећена је значају и анализи аутоматизованог информационог система „Археологическа карта на България”, почев од његовог настанка до данас, са запажањима о могућој надоградњи самог система. Ово поглавље садржи доста корисних информација, посебно оних које се односе на процес настанка и развој Археолошке карте Бугарске, чији се систем константно надограђује. Такав један разрађен систем несумњиво је користан и могао би да нађе примену и у српској археологији. У четвртном поглављу, *Географска информационна система „Археологическа карта на България”*, ауторка је представила археолошки географски информациони систем „ГИС АКБ”, са детаљним упутством за рад, истичући његове предности у односу на претходни – археолошки информациони систем (АИС АКБ), као и унапређење постојеће верзије. ГИС АКБ 4.0 заправо представља електронску базу података која превазилази оквири класичних каталога локалитета. Ова платформа, заснована на динамичним географским елементима уместо статичке теренске документације користи синхронизацију топографских података, покретних археолошких налаза и стратиграфских јединица које посматра у јединственом просторном наративу. Детаљно представљене интеграције традиционалних археолошких записа и савремених информационих система стварају интерактивну архиву са динамичким претраживањем и визуализацијом података, чиме се унапређује интердисциплинарна интерпретација археолошког наслеђа, потпомаже дугорочна конзервација и олакшава доношење стручних одлука у процесима истраживања, заштите и презентације културне баштине. Након закључног разматрања, ауторка у овој студији читаоцима доноси три прилога. У првом представља додатне информације о основним концептима, елементима, сензорима и платформама даљинске детекције; у другом кроз фотографије даје приказ папирних регистрационих картица локалитета са археолошке карте Бугарске као и њихову накнадну обраду; док трећи прилог чини енглеско-бугарски речник са дефиницијама термина који су коришћени у студији. За српску археолошку заједницу, монографија Надежде Кечеве не представља само вредан извор инспирације већ и полазиште за успостављање конкретних модела сарадње. Ако се има у виду да Бугарска и Србија деле сличне изазове, попут убрзаног инфраструктурног развоја, недовољно развијене законске регулативе заштите археолошких локалитета и фрагментираности дигиталних база података, наведено дело се може посматрати као потенцијални прототип за развој регионалне интегрисане платформе за документацију, управљање и заштиту археолошког наслеђа.

Срећко ЖИВАНОВИЋ, Пешар КОЈАДИНОВИЋ

EDITORIAL POLICY OF THE JOURNAL *STARINAR*

The journal *Starinar* is dedicated to topics in the areas of archaeology, history, history of arts, architecture and similar scholarly disciplines.

The journal *Starinar* started to be published in 1884 as a periodical publication issued by the Serbian Archaeological Society, and in 1950 it became the periodical of the Institute of Archaeology in Belgrade.

The journal *Starinar* publishes original papers that have not been published previously: original scientific articles, excavation reports, scientific reviews, book reviews, critical reviews, bibliographies, necrologies. Some issues of *Starinar* can be dedicated to emeritus researchers in the field of archaeology.

Starinar is an Open Access journal.

Articles can be submitted in English, German or French. If the paper is written in English, summary can be in Serbian (for authors from Serbia) or English (for international authors), while articles submitted in German or French need to have a summary in English.

Papers for *Starinar* have to be submitted to the editorial secretary and must be formatted in accordance with the Guidelines/ Submission instructions for authors.

The Journal is issued once a year.

Online First option is applied in *Starinar*: an electronic version of an accepted manuscript is made available online after the Editorial Board accepts the manuscript for publishing and after the editing and proofreading procedure.

Journal *Starinar* publishes articles from the fields of archaeology, history, architecture, history of arts, classical philology, physical anthropology, etc.

EDITORIAL RESPONSIBILITIES

The Editorial Board is responsible for deciding which articles submitted to *Starinar* will be published. The Editorial Board is guided by the Editorial Policy and constrained by legal requirements in force regarding libel, copyright infringement and plagiarism.

The Editorial Board reserves the right to decide not to publish submitted manuscripts in case it is found that they do not meet relevant standards concerning the content and formal aspects. The Editorial Staff will inform the authors whether the manuscript is accepted for publication within 120 days from the date of the manuscript submission.

Editorial Board must hold no conflict of interest with regard to the articles they consider for publication. If an Editor feels that there is likely to be a perception of a conflict of interest in relation to their handling of a submission, the selection of review-

ers and all decisions on the paper shall be made by the editor and editorial board.

Editorial Board shall evaluate manuscripts for their intellectual content free from any racial, gender, sexual, religious, ethnic, or political bias.

The Editor and the Editorial Staff must not use unpublished materials disclosed in submitted manuscripts without the express written consent of the authors. The information and ideas presented in submitted manuscripts shall be kept confidential and must not be used for personal gain.

The journal *Starinar* applies the system of double-blind peer review. Editors and the Editorial Staff shall take all reasonable measures to ensure that the reviewers remain anonymous to the authors before, during and after the evaluation process and the authors remain anonymous to reviewers until the end of the review procedure.

Papers prepared for publishing should be submitted to the editorial secretary between 20 November to 20 December of the current year for the volume that will be published the following year. The Editorial board meets after the submission of all papers. At the first meeting, reviewers are selected and assigned manuscripts for review.

AUTHORS' RESPONSIBILITIES

Authors warrant that their manuscript is their original work, that it has not been published before and is not under consideration for publication elsewhere. Parallel submission of the same paper to another journal constitutes a misconduct and eliminates the manuscript from consideration by *Starinar*.

The Authors also warrant that the manuscript is not and will not be published elsewhere (after the publication in *Starinar*) in any other language without the consent of the Publisher.

In case a submitted manuscript is a result of a research project, or its previous version has been presented at a conference in the form of an oral presentation (under the same or similar title), detailed information about the project, the conference, etc. shall be provided in front of the first footnote and it should be marked with a star. A paper that has already been published in another journal cannot be reprinted in *Starinar*.

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A submitted manuscript should contain sufficient detail and references to permit reviewers and, subsequently, readers to verify the claims presented in it. The deliberate presentation of false claims is a violation of ethical standards. Book reviews, critical reviews, necrologies and other professional articles are reviewed as well and the decision on their acceptance or rejection is made by the Editorial Board based on reviews.

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Authorship

Authors must make sure that all only contributors who have significantly contributed to the submission are listed as authors and, conversely, that all contributors who have significantly contributed to the submission are listed as authors. If persons other than authors were involved in important aspects of the research project and the preparation of the manuscript, their contribution should be acknowledged in a footnote or the Acknowledgments section.

Acknowledgment of Sources

Authors are required to properly cite sources that have significantly influenced their research and their manuscript. Informa-

tion received in a private conversation or correspondence with third parties, in reviewing project applications, manuscripts and similar materials, must not be used without the express written consent of the information source.

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In case plagiarism is discovered in a paper that has already been published by the journal, it will be retracted in accordance with the procedure described below under Retraction policy, and authors will be temporary permitted to publish in *Starinar*.

Conflict of interest

Authors should disclose in their manuscript any financial or other substantive conflict of interest that might have influenced the presented results or their interpretation.

Fundamental errors in published works

When an author discovers a significant error or inaccuracy in his/her own published work, it is the author's obligation to promptly notify the journal Editor or publisher and cooperate with the Editor to retract or correct the paper.

By submitting a manuscript the authors agree to abide by the *Starinar*'s Editorial Policies.

REVIEWERS' RESPONSIBILITIES

Reviewers are required to provide written, competent and unbiased feedback in a timely manner on the scholarly merits and the scientific value of the manuscript.

The reviewers assess manuscript for the compliance with the profile of the journal, the relevance of the investigated topic and applied methods, the originality and scientific relevance of information presented in the manuscript, the presentation style and scholarly apparatus.

Reviewers should alert the Editor to any well-founded suspicions or the knowledge of possible violations of ethical standards by the authors. Reviewers should recognize relevant published works that have not been cited by the authors and alert the Editor to substantial similarities between a reviewed manuscript and any manuscript published or under consideration for publication elsewhere, in the event they are aware of such. Reviewers should also alert the Editor to a parallel submission of the same paper to another journal, in the event they are aware of such.

Reviewers must not have conflict of interest with respect to the research, the authors and/or the funding sources for the

research. If such conflicts exist, the reviewers must report them to the Editor without delay.

Any selected referee who feels unqualified to review the research reported in a manuscript or knows that its prompt review will be impossible should notify the Editor without delay.

Reviews must be conducted objectively. Personal criticism of the author is inappropriate. Reviewers should express their views clearly with supporting arguments.

Any manuscripts received for review must be treated as confidential documents. Reviewers must not use unpublished materials disclosed in submitted manuscripts without the express written consent of the authors. The information and ideas presented in submitted manuscripts shall be kept confidential and must not be used for personal gain.

PEER REVIEW

The submitted manuscripts are subject to a peer review process. The purpose of peer review is to assist the Editorial Board in making editorial decisions and through the editorial communications with the author it may also assist the author in improving the paper.

To every paper submitted to editorial board of Starinar two reviewers are assigned. Reviewers could be members of the Editorial Board, associates of the Institute of Archaeology or eternal associates, with the same or higher scientific degree as the author(s), competent in the field of the manuscript's topic. The suggestions on who the reviewers should be are made by the Editorial Board, and adopted by the Editor-in-Chief.

All papers are reviewed by using the double-blind peer review system: the identity of the author is not known to the reviewers and vice versa. Reviewers shall send their reviews within the period of 30 days after the receipt of the manuscript. Reviewers are not paid for this work.

If a reviewer requires a revision of a manuscript, authors shall send a revised version with changes made in accordance with the reviewer's suggestions within the period of 30 days. In case they consider the revision request unfounded, the authors should send their arguments explaining why they did not make the required revision. The same timeframe applies to revisions of manuscripts that are not written in accordance with the author guidelines.

The decision of acceptance of the paper is made by the Editorial Board of Starinar by majority vote based on the peer reviews and the evaluation of the authors' revision or their arguments, if they did not make changes to the manuscript.

After the final decision on the content of a volume is made, manuscripts are sent for editing and proofreading, and then to a graphic designer, who is responsible for computer layout, design and prepress. Before printing, the authors will have the opportunity to proofread their paper twice in the PDF format. The final approval for printing is given by the Editor-in-Chief. The whole volume should be sent to the printing press by 1 October.

The reviewers selected by the Editorial Board, receive a peer review form with questions that they should answer. The purpose of the questions is to indicate all aspects that they should consider in order to make a decision on the destiny of a paper. In the final part of the form, reviewers are supposed to write their opinion and suggestions how to improve the paper. The identity of reviewers is unknown to authors, before, during and after the review procedure. The identity of authors is unknown

to reviewers before, during and after the review procedure (until the paper is published). It is suggested to authors to avoid formulations that could reveal their identity. The Editorial Board shall ensure that before sending a paper to a reviewer, all personal details of the author (name, affiliation, etc.) will be deleted and that all measures will be undertaken in order to keep the author's identity unknown to the reviewer during the review procedure.

The choice of reviewers is at the Editorial Board's discretion. The reviewers must be knowledgeable about the subject area of the manuscript; and they should not have recent joint publications with any of the authors.

All of the reviewers of a paper act independently and they are not aware of each other's identities. If the decisions of the two reviewers are not the same (accept/reject), the Editor may assign additional reviewers.

During the review process Editor may require authors to provide additional information (including raw data) if they are necessary for the evaluation of the scholarly merit of the manuscript. These materials shall be kept confidential and must not be used for personal gain.

The Editorial team shall ensure reasonable quality control for the reviews. With respect to reviewers whose reviews are convincingly questioned by authors, special attention will be paid to ensure that the reviews are objective and high in academic standard. When there is any doubt with regard to the objectivity of the reviews or quality of the review, additional reviewers will be assigned.

PROCEDURES FOR DEALING WITH UNETHICAL BEHAVIOUR

Anyone may inform the editors and/or Editorial Staff at any time of suspected unethical behaviour or any type of misconduct by giving the necessary information/evidence to start an investigation.

Investigation

- Editor-in-Chief will consult with the Editorial Board on decisions regarding the initiation of an investigation.
- During an investigation, any evidence should be treated as strictly confidential and only made available to those strictly involved in investigating.
- The accused will always be given the chance to respond to any charges made against them.
- If it is judged at the end of the investigation that misconduct has occurred, then it will be classified as either minor or serious.

Minor misconduct

Minor misconduct will be dealt directly with those involved without involving any other parties, e.g.:

- Communicating to authors/reviewers whenever a minor issue involving misunderstanding or misapplication of academic standards has occurred.
- A warning letter to an author or reviewer regarding fairly minor misconduct.

Major misconduct

The Editor-in-Chief, in consultation with the Editorial Board, and, when appropriate, further consultation with a small group of experts should make any decision regarding the course of

action to be taken using the evidence available. The possible outcomes are as follows (these can be used separately or jointly):

- Publication of a formal announcement or editorial describing the misconduct.
- Informing the author's (or reviewer's) head of department or employer of any misconduct by means of a formal letter.
- The formal, announced retraction of publications from the journal in accordance with the Retraction Policy (see below).
- A ban on submissions from an individual for a defined period.
- Referring a case to a professional organization or legal authority for further investigation and action.

When dealing with unethical behaviour, the Editorial Staff will rely on the guidelines and recommendations provided by the Committee on Publication Ethics (COPE): <http://publicationethics.org/resources/>.

RETRACTION POLICY

Legal limitations of the publisher, copyright holder or author(s), infringements of professional ethical codes, such as multiple submissions, bogus claims of authorship, plagiarism, fraudulent use of data or any major misconduct require retraction of an article. Occasionally a retraction can be used to correct errors in submission or publication. The main reason for withdrawal or retraction is to correct the mistake while preserving the integrity of science; it is not to punish the author.

Standards for dealing with retractions have been developed by a number of library and scholarly bodies, and this practice has been adopted for article retraction by *Starinar*: in the electronic version of the retraction note, a link is made to the original article. In the electronic version of the original article, a link is made to the retraction note where it is clearly stated that the article has been retracted. The original article is retained unchanged, save for a watermark on the PDF indicating on each page that it is "retracted."

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The journal *Starinar* allows authors to deposit the accepted, reviewed version of the manuscript, as well as final, published

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SUBMISSION INSTRUCTIONS FOR THE *STARINAR* JOURNAL

By applying the new rules (Acta) for publishing activities issued by the Institute of Archaeology, Belgrade and in accordance with the editorial policy of the Starinar journal, the editorial board of the Starinar journal have decided to improve its quality and, thus, contribute to its full integration into the international system of exchanging scientific information.

The Starinar journal is dedicated to topics from the scientific areas of archaeology, history, history of arts, architecture and similar scientific disciplines.

The Starinar journal publishes original papers that have not been previously published: original scientific articles, excavation reports, scientific reviews, book reviews, critiques, bibliographies and necrologies.

Articles can be submitted in English, German or French. If the paper is written in English, the summary can be written in Serbian (for authors from Serbia) or English (for foreign authors), while articles submitted in German or French need to have the summary in English.

Articles submitted to the Starinar editorial board must contain customary data. Each article should therefore include: title; author's forename and surname; affiliation; abstract; key words; main text; summary; graphic images with list of captions; bibliography; contact details.

1. The title should be short and clear, reflecting as much as possible the content of the article. The title should include words which are easy to index and search for. If there are no such words integrated into the title, it is preferable to have an added subtitle. The title should appear in either the fifth or sixth row under the upper margin, in bold, with a font size of 14 pts.

2. The author or authors should include their full names.

3. The author or authors should write the official name and address of the institution they represent, together with, where applicable, the official name and address of the location where they performed their research. With complex institutions, all names should be included (e.g. University of Belgrade, Philosophical Faculty, Department of Archaeology, Belgrade).

4. The abstract represents a short overview of the article (100–250 words). It is advisable for this to contain words which are easy to index or search for. The abstract should offer data about the research goal, method, results and conclusion. Abstracts should be written in the same language as the article

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6. Articles should be no longer than 32 DIN A4 pages, including footnotes and illustrations. The body text should be written digitally, using Times New Roman or Arial font (font size 12 pts), MS Office Word 97 or later, with a line spacing of 1.5 and margins set to 2.54 cm. The body text must not contain illustrations. Illustrations must be submitted as separate files.

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Footnotes can be included in the main paper. They should contain less important data, required explanations and cited literature. (A separate chapter of the Submission Instructions details the required method for quoting that is to be applied when writing a paper).

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In the list of references: **Popović 2009** – I. Popović, Gilt Fibula with Christogram from the Imperial Palace in Sirmium (Резиме: Позлаћена фибула са христогрaмом из царске палате у Сирмијуму) *Starinar* LVII (2007), 2009, 101–112.

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Quotation within a footnote: (Поповић 1994, 65)

In the list of references: **Поповић 1994** – И. Поповић, (прир.), *Античко сребро у Србији*, Београд 1994. (I. Popović, (prir.), *Antičko srebro u Srbiji*, Beograd, 1994.)

11. Parts of references (authors' names, title, source etc.) are to be quoted in accordance with the accepted quoting form. The most commonly quoted references are listed below:

(MONOGRAPHS)

1. How to quote an author's books:

a. A single author

In a footnote: (Popović 2006, 21)

In the list of references: **Popović 2006** – I. Popović, *Roma aeterna inter Savum et Danubium*, Belgrade 2006.

b. Two authors

In a footnote: (Vasić, Milošević 2000, 125)

In the list of references: **Vasić, Milošević 2000** – M. Vasić, G. Milošević. 2000. *Mansio Idimvm rimska poštanska i putna stanica kod Medvede*, Beograd, 2000.

c. Three or more authors

In a footnote: (Petković et al. 2005, 129–131)

In the list of references: **Petković et al. 2005** – S. Petković, M. Ružić, S. Jovanović, M. Vuksan, & Z. K. Zoffmann. 2005. *Roman and Medieval Necropolis in Ravna near Knjaževac*. Belgrade, 2005.

2. Quotation of papers in serial publication, collection of papers:

In a footnote: (Popović 2014, 261)

In the list of references: **Popović 2014** – I. Popović, The Motif of Christogram on the Architectural Elements of the Imperial Palace in Sirmium, in: *The Edict of Serdica (AD 311). Concepts and Realizations of the Idea of Religious Toleration*, (ed.) V. Vachkova, D. Dimitrov, Sofia 2014, 261–276.

3. How to quote prepared editions

(editor, translator or preparator instead of author):

In a footnote: (Поповић 1994, 65)

In the list of references: **Поповић 1994** – И. Поповић, (прир.), *Античко сребро у Србији*, Београд 1994. (I. Popović, (prir.), *Antičko srebro u Srbiji*, Beograd, 1994.)

4. How to quote books without indicated author:

In a footnote: (*Гамзиград. Касноантички царски двораци* 1983, 43)

In the list of references: **Гамзиград. Касноантички царски двораци 1983** – *Гамзиград. Касноантички царски двораци*, Београд 1983. (*Gamzigrad. Kasnoantički dvoraci*, Beograd, 1983.)

5. Quoting several books of the same author:

a. written in different alphabets

In a footnote: (Поповић 2002, 23–26; Popović 2006, 33)

In the list of references:

Поповић 2002 – И. Поповић, *Накит са Јухора, остiава или сакрални тезаурус*, Београд 2002. (I. Popović, *Nakit sa Juhora, ostava ili sakralni tezaurus*, Beograd, 2002.)

Popović 2006 – I. Popović, *Roma Aeterna inter Savum et Danubium*. Belgrade, 2006.

b. written in the same year

In a footnote: (Dawkins 1996a; 1996b)

In the list of references:

Dawkins 1996a – R. Dawkins, *Climbing Mount Improbable*, London, 1996.

Dawkins 1996b – R. Dawkins, *River out of Eden*, London, 1996.

6. Quoting chapters or parts of books:

In a footnote: (Кондић 1994, 66)

In the list of references: **Кондић 1994** – J. Kondić, Рано-византијско сребро, у: *Античко сребро у Србији*, И. Поповић, (ур.), Београд 1994, 65–67. (J. Kondić, Ranovizantijsko srebro, u: *Antičko srebro u Srbiji*, I. Popović, (ur.), Beograd 1994, 65–67.)

7. Quoting chapters or parts of previously published books (as an original source):

In a footnote: (Cicero 1986, 35)

In the list of references: **Cicero 1986** – Cicero Quintus Tullius, Handbook on canvassing for the consulship, in: *Rome: Late republic and principate*, W. E. Kaegi, P. White (eds.), vol. 2, Chicago, 1986, 33–46. Originally published in: E. Shuckburgh (trans.) *The letters of Cicero*, vol. 1, London, 1908.

8. Quoting books which have been published on-line:

In a footnote: (Kurland, Lerner 1987)

In the list of references: **Kurland, Lerner 1987** – Ph. B. Kurland, R. Lerner, (eds.) *The founders' Constitution*. Chicago 1987. //press-pubs.uchicago.edu/founders/, accessed (date of visit to the page)

ARTICLES FROM PRINTED PERIODICALS OR PERIODICALS PUBLISHED ON-LINE

9. Quoting an article from a printed periodical:

In a footnote: (Vasić 2004, 91, fig. 17)

In the list of references: **Vasić 2004** – M. Vasić, Bronze railing from Mediana. *Starinar* LIII–LIV 2004, 79–109.

10. Quoting an article from a periodical published on-line:

In a footnote: (Van Eijck 2009, 41)

In the list of references: **Van Eijck 2009** – D. Van Eijck, Learning from simpler times, *Risk Management*, vol. 56, no 1, 2009, 40–44. <http://proquest.umi.com/>, accessed (date of visit to the page)

DOCTORAL AND MASTER THESES

11. Quoting doctoral or master theses:

In a footnote: (Ilić 2005, 25–32)

In the list of references: **Ilić 2005** – O. Ilić, *Ranohrišćanski pokretni nalazi na području dijeceze Dakije od IV do početka VII veka*. Unpublished MA thesis, University of Belgrade, 2005.

LECTURES FROM SCIENTIFIC GATHERINGS

12. Quoting a published lecture or communication presented at a scientific gathering:

In a footnote: (Vasić 2008, 69, fig. 3)

In the list of references: **Vasić 2008** – M. Vasić, Stibadium in Romuliana and Mediana. *Felix Romvliana 50 years of archaeological excavations*, M. Vasić (ed.), (Papers from the International Conference, October, 27–29 2003, Zaječar, Serbia), Belgrade–Zaječar 2006, 69–75.

13. Quoting an unpublished lecture or communication presented at a scientific gathering:

In a footnote: (Gavrilović 2004)

In the list of references: **Gavrilović 2004** – N. Gavrilović, *Interpretatio Romana* of Oriental Cults in Upper Moesia from I

to IV century A.D. Paper presented at the 10th Annual meeting of the European Association of Archaeologists, September 7–12, 2004 in Lyon, France.

POPULAR MAGAZINES (PERIODICALS) AND NEWSPAPER ARTICLES

14. Quoting an article from a popular magazine:

In a footnote: (Јањић 2007, 32–33)

In the list of references: **Јањић 2000** – Ј. Јањић, Прво хришћанско знамење, *НИН*, јул 2007. (J. Janjić, Prvo hrišćansko znamenje, *NIN*, jul 2007.)

15. Quoting an article from a newspaper:

In a footnote: (Марковић-Штрбац 1999)

In the list of references: **Марковић-Штрбац 1999** – С. Марковић-Штрбац, Пустахије са Јухора, *Политика*, 18. септембар 1999, Одељак Култура, уметност, наука. (S. Marković-Štrbac, Pustahije sa Juhora, *Politika*, 18. septembar 1999, Odeljak Kultura, umetnost, nauka.)

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In a footnote: (Pliny the Elder, Perseus Digital Library)

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књ. 1 (1922) - књ. 15 (1940) ; н.с., књ. 1, год. 1 (1950)- .
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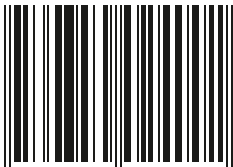
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= ISSN 2406-0739

ISSN 0350-0241 = Старинар
COBISS.SR-ID 8111874

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9 770350 024001